checket by AT 6/20/17

CERTIFICATION

SDG No:

FA41752

Laboratory:

Accutest, Florida

Site:

BMS, Humacao, PR

Matrix:

AQ - Water

SUMMARY:

Groundwater samples (Table 1) were collected on the BMSMC, Humacao, PR. Samples were taken March 1-2, 2017 and were analyzed in Accutest Laboratory of Orlando, Florida that reported the data under SDG No.: FA41752. Results were validated using the latest validation guidelines (July, 2015) of the EPA Hazardous Waste Support Section or the QC requirements of the method employed. The analyses performed are shown in Table 1. Individual data review worksheets are enclosed for each target analyte group. The organic data sample summary form shows for analyte results that were qualified.

In summary the results are valid and can be used for decision making purposes.

Table 1. Samples analyzed and analysis performed

| SAMPLE ID | SAMPLE DESCRIPTION | MATRIX | ANALYSIS PERFORMED |
|------------|-----------------------|------------------|---------------------------|
| FA41752-1 | EB030317 | AQ – Equipment | VOCs; SVOCs; SVOCs (SIM); |
| | | Blank | VPHs; EPHs; Pesticides |
| FA41752-2 | OSMW-1S | Groundwater | VOCs; SVOCs; SVOCs (SIM); |
| | | | VPHs; EPHs; Pesticides |
| FA41752-2D | OSMW-1S MSD | Groundwater | VOCs; SVOCs; SVOCs (SIM); |
| | | | VPHs; EPHs; Pesticides |
| FA41752-2S | OSMW-1S MS | Groundwater | VOCs; SVOCs; SVOCs (SIM); |
| | | | VPHs; EPHs; Pesticides |
| FA41752-3 | FB030117 | AQ – Field Blank | VOCs; SVOCs; SVOCs (SIM); |
| | | Water | VPHs; EPHs; Pesticides |
| FA41752-4 | OSMW-1D | Groundwater | VOCs; SVOCs; SVOCs (SIM); |
| | | | VPHs; EPHs; Pesticides |
| FA41752-5 | EB030217 | AQ – Equipment | VOCs; SVOCs; SVOCs (SIM); |
| | | Blank | VPHs; EPHs; Pesticides |
| FA41752-6 | OSMW-3S | Groundwater | VOCs; SVOCs; SVOCs (SIM); |
| | | | VPHs; EPHs; Pesticides |
| FA41752-7 | OSMW-3D | Groundwater | VOCs; SVOCs; SVOCs (SIM); |
| | | | VPHs; EPHs; Pesticides |
| FA41752-8 | FB030217 | AQ – Field Blank | VOCs; SVOCs; SVOCs (SIM); |
| | | Water | VPHs; EPHs; Pesticides |
| FA41752-9 | OSMW-25 | Groundwater | VOCs; SVOCs; SVOCs (SIM); |
| | | | VPHs; EPHs; Pesticides |
| FA41752-10 | OSMW-2D | Groundwater | VOCs; SVOCs; SVOCs (SIM); |
| | | | VPHs; EPHs; Pesticides |

Reviewer Name:

Rafael Infante

Chemist License 1888

Signature:

Date:

April 18, 2017

Méndez IC # 1888 7221

CERTIFICATION

SDG No:

FA41752

Site:

BMS, Humacao, PR

Laboratory:

Accutest, Florida

Matrix:

AQ - Water

•627938

SUMMARY:

Groundwater samples (Table 1) were collected on the BMSMC, Humacao, PR. Samples were taken March 1-2, 2017 and were analyzed in Accutest Laboratory of Orlando, Florida that reported the data under SDG No.: FA41752. Results were validated using the latest validation guidelines (July, 2015) of the EPA Hazardous Waste Support Section or the QC requirements of the method employed. The analyses performed are shown in Table 1. Individual data review worksheets are enclosed for each target analyte group. The organic data sample summary form shows for analyte results that were qualified.

In summary the results are valid and can be used for decision making purposes.

Table 1. Samples analyzed and analysis performed

| SAMPLE ID | SAMPLE | MATRIX | ANALYSIS PERFORMED |
|------------|-------------|---------------------------|---------------------|
| | DESCRIPTION | | |
| FA41752-1 | EB030317 | AQ – Equipment Blank | Hexachlorobutadiene |
| FA41752-2 | OSMW-1S | Groundwater | Hexachlorobutadiene |
| FA41752-2D | OSMW-15 MSD | Groundwater | Hexachlorobutadiene |
| FA41752-2S | OSMW-15 MS | Groundwater | Hexachlorobutadiene |
| FA41752-3 | FB030117 | AQ – Field Blank Water | Hexachlorobutadiene |
| FA41752-4 | OSMW-1D | Groundwater | Hexachlorobutadiene |
| FA41752-5 | EB030217 | AQ – Equipment Blank | Hexachlorobutadiene |
| FA41752-6 | OSMW-3S | Groundwater | Hexachlorobutadiene |
| FA41752-7 | OSMW-3D | Groundwater | Hexachlorobutadiene |
| FA41752-8 | FB030217 | AQ – Field Blank Water | Hexachlorobutadiene |
| FA41752-9 | OSMW-2S | Groundwater | Hexachlorobutadiene |
| FA41752-10 | OSMW-2D | Groundwater | Hexachlorobutadiene |

Reviewer Name:

Rafael Infante

Chemist License 1888

Signature:

Date:

June 22, 2017

Report of Analysis

Page 1 of 1

Client Sample ID: EB030117 Lab Sample ID:

FA41752-1

Matrix: Method: AQ - Equipment Blank SW846 8260C

Project:

BMSMC; Humacao, PR

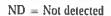
Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids:

| _ | File ID 146056.D | DF I | Analyzed 03/07/17 13:25 | By WV | Prep Date | Prep Batch | Analytical Batch VI1286 |
|------------|---------------------|---------|----------------------------|----------|-----------|------------|----------------------------|
| ACCOUNT TO | | | | | | | |

| Compound | Result | RL | MDL | Unit |
|-------------------------|---|--|--|---------|
| Benzene | ND | 1.0 | 0.31 | ug/l |
| Chloroform | ND | 1.0 | 0.30 | ug/l |
| Dichlorodifluoromethane | ND | 2.0 | 0.50 | ug/l |
| 1,2-Dichloroethane | ND | 1.0 | 0.31 | ug/l |
| Hexachlorobutadiene | ND | 2.0 | 0.30 | ug/l |
| Methyl Tert Butyl Ether | ND | 1.0 | 0.23 | ug/l |
| Tert-Amyl Alcohol | ND | 20 | 5.3 | ug/l |
| Vinyl Chloride | ND | 1.0 | 0.41 | ug/l |
| Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its |
| Dibromofluoromethane | 98% | | 83-1 | 18% |
| 1,2-Dichloroethane-D4 | 105% | | 79-1 | 25% |
| Toluene-D8 | 101% | | | 12% |
| 4-Bromofluorobenzene | 102% | | | 18% |
| | Benzene Chloroform Dichlorodifluoromethane 1,2-Dichloroethane Hexachlorobutadiene Methyl Tert Butyl Ether Tert-Amyl Alcohol Vinyl Chloride Surrogate Recoveries Dibromofluoromethane 1,2-Dichloroethane-D4 Toluene-D8 | Benzene ND Chloroform ND Dichlorodifluoromethane ND 1,2-Dichloroethane ND Hexachlorobutadiene ND Methyl Tert Butyl Ether ND Tert-Amyl Alcohol ND Vinyl Chloride ND Surrogate Recoveries Run# 1 Dibromofluoromethane 98% 1,2-Dichloroethane-D4 105% Toluene-D8 101% | Benzene ND 1.0 Chloroform ND 1.0 Dichlorodifluoromethane ND 2.0 1,2-Dichloroethane ND 1.0 Hexachlorobutadiene ND 2.0 Methyl Tert Butyl Ether ND 1.0 Tert-Amyl Alcohol ND 20 Vinyl Chloride ND 1.0 Surrogate Recoveries Run# 1 Run# 2 Dibromofluoromethane 98% 1,2-Dichloroethane-D4 105% Toluene-D8 101% | Benzene |





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank





Report of Analysis

Page 1 of 1

Client Sample ID: EB030117 Lab Sample ID: FA41752-1

Matrix: AQ - Equipment Blank

Method: Project:

SW846 8270D SW846 3510C

BMSMC, Humacao, PR

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

File ID DF Analyzed By Prep Date Prep Batch **Analytical Batch** Run #1 L0690372.D 1 03/09/17 NG 03/08/17 OP64081 SL3965 Run #2

RL

MDL

Units

Q

Final Volume Initial Volume Run #1 1050 ml 1.0 ml

Compound

Run #2

CAS No.

100-52-7 24 Benzaldehyde ND 4.8 ug/l 117-81-7 bis(2-Ethylhexyl)phthalate ND 4.8 0.95 ug/l

Result

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

4165-60-0 Nitrobenzene-d5 74% 42-108% 321-60-8 2-Fluorobiphenyl 70% 40-106% 1718-51-0 Terphenyl-d14 66% 39-121%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: EB030117 Lab Sample ID: FA41752-1

Matrix:

AQ - Equipment Blank

Date Sampled: 03/01/17 Date Received: 03/03/17

Method:

SW846 8270D BY SIM SW846 3510C

Percent Solids: n/a

Project:

BMSMC, Humacao, PR

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|----------|------------|----|----------|----|-----------|------------|------------------|
| Run #1 | W097848.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 a | U060368A.D | 1 | 03/14/17 | NJ | 03/11/17 | OP64133 | SU2649 |
| Run #3 b | U060340.D | 1 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |

| Run #1 Run #2 Run #3 | Initial Volume 1050 ml 950 ml 1050 ml | Final Volum 1.0 ml 1.0 ml 1.0 ml | ie | | | | | | |
|----------------------------|--|---|--------|------|-------|-------|---|--|---|
| CAS No. | Compound | | Result | RL | MDL | Units | Q | | Q |
| 56-55-3 | Benzo(a)anthra | cene | ND | 0.19 | 0.038 | ug/l | | | |

| 123-91-1 91-20-3 | 1,4-Dioxane Naphthalene | ND c | 0.32 0.95 | 0.16 ug/ 0.38 ug/ | |
|------------------------------------|--|-------------------------|-------------------|--|-------------------------------|
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Run# 3 | Limits |
| 4165-60-0 321-60-8 1718-51-0 | Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 | 60% d 69% d 56% d | 86% 74% 87% | 70% ^d 61% ^d 68% ^d | 42-108% 40-106% 39-121% |

- (a) Sample re-extracted beyond hold time; re-extract results reported due to suspected laboratory contamination in original extract.
- (b) Confirmation run.
- (c) Result is from Run# 2
- (d) Surrogate recoveries corrected for actual spike amount.



ND = Not detected

MDL = Method Detection Limit

J = Indicates an estimated value

RL = Reporting Limit

B = Indicates analyte found in associated method blank

E = Indicates value exceeds calibration range



Report of Analysis

By

AJC

Page 1 of 1

Client Sample ID: EB030117 Lab Sample ID:

FA41752-1

Matrix: Method: AQ - Equipment Blank MADEP VPH REV 1.1 Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

Project:

BMSMC, Humacao, PR

1

File ID DF Analyzed

Prep Batch **Analytical Batch** n/a GUU1012

Run #1 Run #2

Purge Volume

5.0 ml

UU019247.D

Run #1

Run #2

MADEP VPH List

CAS No. Compound Result

03/09/17

RL

100

MDL

Prep Date

n/a

Units

Q

C9- C10 Aromatics (Unadj.)

ND

35

ug/l

CAS No. Surrogate Recoveries Run#1

Run#2

Limits

460-00-4 BFB 460-00-4 BFB 111% 107% 70-130% 70-130%



B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound



E = Indicates value exceeds calibration range

J = Indicates an estimated value

Report of Analysis

Page 1 of 1

Client Sample ID: EB030117

Lab Sample ID: FA41752-1 Matrix:

AQ - Equipment Blank MADEP EPH REV 1.1 SW846 3510C Method:

Date Received: 03/03/17

BMSMC, Humacao, PR

Percent Solids: n/a

03/01/17

Date Sampled:

Project:

File ID DF Analyzed By Prep Date Prep Batch **Analytical Batch** 03/06/17 OP64057 **GNN896** Run #1 NN017755.D 1 03/10/17 MG

Run #2

Initial Volume Final Volume

Run #1 1030 ml 2.0 ml

Run #2

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|-------|------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 190 | 78 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run#2 | Lim | its | |
| 3386-33-2 | 1-Chlorooctadecane | 65% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 100% | | 40-1 | 40% | |
| 84-15-1 | o-Terphenyl | 88% | | 40-1 | 40% | |
| 321-60-8 | 2-Fluorobiphenyl | 102% | | 40-1 | 40% | |



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: EB030117 Lab Sample ID: FA41752-1

Matrix: AQ - Equipment Blank

Method: SW846 8081B SW846 3510C Project: BMSMC, Humacao, PR

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

Analytical Batch File ID DF Analyzed Prep Date Prep Batch By Run #1 TT381283.D 1 03/11/17 MV 03/06/17 OP64048 GTT1925 Run #2

Initial Volume Final Volume Run #1 1040 ml 5.0 ml

Run #2

CAS No. Compound Result RL **MDL** Q Units

60-57-1 Dieldrin 0.0096 ND 0.0023 ug/l

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

877-09-8 Tetrachloro-m-xylene 80% 42-127% 2051-24-3 Decachlorobiphenyl 27% 27-127%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-1S Lab Sample ID: FA41752-2

Matrix: Method: Project:

AQ - Ground Water SW846 8260C

BMSMC; Humacao, PR

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

File ID DF Analyzed By Prep Date Prep Batch **Analytical Batch** Run #1 146057.D 1 03/07/17 13:48 WV n/a VI1286 Run #2

| J | Purge Volume | |
|--------|--------------|--|
| Run #1 | 5.0 ml | |
| Run #2 | | |
| Run #2 | | |
| | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|------------|-------------------------|--------|--------|------|-------|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.31 | ug/l | |
| 67-66-3 | Chloroform | ND | 1.0 | 0.30 | ug/l | |
| 75-71-8 | Dichlorodifluoromethane | ND | 2.0 | 0.50 | ug/l | |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.31 | ug/l | |
| 87-68-3 | Hexachlorobutadiene | ND | 2.0 | 0.30 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.23 | ug/l | |
| 75-85-4 | Tert-Amyl Alcohol | ND | 20 | 5.3 | ug/l | |
| 75-01-4 | Vinyl Chloride | ND | 1.0 | 0.41 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 1868-53-7 | Dibromofluoromethane | 98% | | 83-1 | 18% | |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 106% | | 79-1 | | |
| 2037-26-5 | Toluene-D8 | 104% | | 85-1 | | |
| 460-00-4 | 4-Bromofluorobenzene | 101% | | 83-1 | 18% | |
| | | | | | | |



ND = Not detected

MDL = Method Detection Limit

J = Indicates an estimated value

RL = Reporting Limit

B = Indicates analyte found in associated method blank

E = Indicates value exceeds calibration range





Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-1S Lab Sample ID: FA41752-2

Matrix: Method: AQ - Ground Water

SW846 8270D SW846 3510C BMSMC, Humacao, PR

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

File ID DF Analyzed Prep Date Prep Batch **Analytical Batch** Ву Run #1 L0690373.D 03/09/17 NG 03/08/17 OP64081 SL3965

Run #2

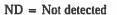
Project:

Initial Volume Final Volume Run #1 1040 ml 1.0 ml

Run #2

CAS No. RL Compound Result **MDL** Units Q 100-52-7 Benzaldehyde ND 24 4.8 ug/l 117-81-7 bis(2-Ethylhexyl)phthalate ND 4.8 0.96ug/l CAS No. Surrogate Recoveries Run#1 Run#2 Limits 4165-60-0 Nitrobenzene-d5 75% 42-108% 321-60-8 2-Fluorobiphenyl 72% 40-106% 1718-51-0 Terphenyl-d14 66% 39-121%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-1S Lab Sample ID: FA41752-2

AQ - Ground Water

Date Sampled: 03/01/17 Date Received: 03/03/17

Matrix: Method:

SW846 8270D BY SIM SW846 3510C

Final Volume

1.0 ml

Percent Solids:

Project:

Run #1

321-60-8

1718-51-0

BMSMC, Humacao, PR

| Run #1 Run #2 | File ID W097849.D U060358.D | DF 1 100 | Analyzed 03/08/17 03/09/17 | By FS NJ | Prep Date 03/08/17 03/08/17 | Prep Batch OP64082 OP64082 | Analytical Batch SW4352 SU2648 |
|------------------|-----------------------------------|----------------|----------------------------------|----------------|-----------------------------------|----------------------------------|--------------------------------------|
| | | | | | | | |

0% b

0% b

40-106%

39-121%

| Run #2 | 1040 ml 1.0 ml | | | | | | |
|--------------------------------|--|------------------------------|--------------------|---------------------|----------------------|---|--|
| CAS No. | Compound | Result | RL | MDL | Units | Q | |
| 56-55-3 123-91-1 91-20-3 | Benzo(a)anthracene 1,4-Dioxane Naphthalene | ND 791 ^a ND | 0.19 29 0.96 | 0.038 14 0.38 | ug/l ug/l ug/l | В | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | | |
| 4165-60-0 | Nitrobenzene-d5 | 60% c | 0% b | 42-1 | 08% | | |

63% c

55% c

(a) Result is from Run# 2

(b) Outside control limits due to dilution.

2-Fluorobiphenyl

Terphenyl-d14

Initial Volume

1040 ml

(c) Surrogate recoveries corrected for actual spike amount.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Page 1 of 1

SGS Accutest

Report of Analysis

Client Sample ID: OSMW-1S

Lab Sample ID: FA41752-2
Matrix: AO - Groun

AQ - Ground Water

Method: Project: MADEP VPH REV 1.1 BMSMC, Humacao, PR Date Sampled: 03/01/17
Date Received: 03/03/17

Percent Solids: n/a

File ID DF Analyzed By Prep Date Prep Batch Analytical Batch
Run #1 UU019248.D 1 03/09/17 AJC n/a n/a GUU1012

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

MADEP VPH List

CAS No. Compound Result RL MDL Units Q

C9- C10 Aromatics (Unadj.) ND 100 35 ug/l

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

 460-00-4
 BFB
 109%
 70-130%

 460-00-4
 BFB
 106%
 70-130%



E = Indicates value exceeds calibration range

B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound

Report of Analysis

By

MG

Page 1 of 1

Client Sample ID: OSMW-1S FA41752-2

Lab Sample ID: Matrix:

AQ - Ground Water

Date Sampled: Date Received:

03/01/17 03/03/17

Method:

MADEP EPH REV 1.1 SW846 3510C

Percent Solids: n/a

Project:

BMSMC, Humacao, PR

DF

1

Analytical Batch Prep Batch

Run #1

File ID NN017756.D Analyzed 03/10/17

Prep Date 03/06/17

OP64057

GNN896

Run #2

Initial Volume 1020 ml

Final Volume 2.0 ml

Run #1 Run #2

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|--------|------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 200 | 78 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 3386-33-2 | 1-Chlorooctadecane | 53% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 95% | | 40-1 | 40% | |
| 84-15-1 | o-Terphenyl | 79% | | 40-1 | 40% | |
| 321-60-8 | 2-Fluorobiphenyl | 96% | | 40-1 | 40% | |



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-1S Lab Sample ID: FA41752-2

Matrix:

AQ - Ground Water

Method: Project:

SW846 8081B SW846 3510C

BMSMC, Humacao, PR

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

Analytical Batch

File ID DF Analyzed By Prep Date Prep Batch TT381284.D 1 03/11/17 MV 03/06/17 OP64048 GTT1925

Run #1 Run #2

Initial Volume Final Volume Run #1 1050 ml 5.0 ml

Run #2

RL CAS No. Compound Result MDL Units Q

60-57-1 ND Dieldrin 0.0095 0.0023 ug/l

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

877-09-8 Tetrachloro-m-xylene 86% 42-127% 2051-24-3 Decachlorobiphenyl 92% 27-127%



E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: FB030117 Lab Sample ID: FA41752-3

Matrix: Method: AQ - Field Blank Water

Project:

SW846 8260C BMSMC; Humacao, PR Date Sampled: Date Received:

Q

03/01/17 03/03/17

Percent Solids: n/a

DF File ID Analyzed By Prep Date Prep Batch **Analytical Batch** Run #1 I46058.D 1 03/07/17 14:11 WV n/a n/a VI1286 Run #2

| | Purge Volume | | |
|--------|--------------|------|--|
| Run #I | 5.0 ml | | |
| Run #2 | | | |
| | | | |

| CAS No. | Compound | Result | RL | MDL | Units |
|------------|-------------------------|--------|--------|------|-------|
| 71-43-2 | Benzene | ND | 1.0 | 0.31 | ug/l |
| 67-66-3 | Chloroform | ND | 1.0 | 0.30 | ug/l |
| 75-71-8 | Dichlorodifluoromethane | ND | 2.0 | 0.50 | ug/l |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.31 | ug/l |
| 87-68-3 | Hexachlorobutadiene | ND | 2.0 | 0.30 | ug/l |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.23 | ug/l |
| 75-85-4 | Tert-Amyl Alcohol | ND | 20 | 5.3 | ug/l |
| 75-01-4 | Vinyl Chloride | ND | 1.0 | 0.41 | ug/l |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its |
| 1868-53-7 | Dibromofluoromethane | 99% | | 83-1 | 18% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 107% | | 79-1 | |
| 2037-26-5 | Toluene-D8 | 104% | | 85-1 | |
| 460-00-4 | 4-Bromofluorobenzene | 101% | | 83-1 | |





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank





Report of Analysis

Ву

NG

Page 1 of 1

Client Sample ID: FB030117 Lab Sample ID:

FA41752-3

Matrix:

AQ - Field Blank Water SW846 8270D SW846 3510C Date Sampled: 03/01/17 Date Received: 03/03/17

Method: Project:

BMSMC, Humacao, PR

DF

1

Percent Solids: n/a

File ID Run #1 L0690376.D Analyzed 03/09/17

Prep Date 03/08/17

Prep Batch OP64081

Analytical Batch SL3965

Run #2

Initial Volume 1040 ml

Final Volume 1.0 ml

Run #1 Run #2

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|------------------------------------|--|-------------------|----------------------------|-------------|--------------|---|
| 100-52-7 117-81-7 | Benzaldehyde bis(2-Ethylhexyl)phthalate | ND ND | 24 4.8 | 4.8 0.96 | ug/l ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limi | ts | |
| 4165-60-0 321-60-8 1718-51-0 | Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 | 84% 79% 72% | 42-108 40-106 39-121 | |)6% | |



ND = Not detected RL = Reporting Limit

MDL = Method Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Run #1

Run #2

Report of Analysis

Page 1 of 1

Client Sample ID: FB030117 Lab Sample ID: FA41752-3 Date Sampled: 03/01/17 Matrix: AQ - Field Blank Water Date Received: 03/03/17 Method: SW846 8270D BY SIM SW846 3510C Percent Solids: n/a

Project: BMSMC, Humacao, PR

Initial Volume

1040 ml

950 ml

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|----------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 | W097852.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 a | U060369.D | 1 | 03/14/17 | NJ | 03/11/17 | OP64133 | SU2649 |
| Run #3 b | U060353.D | 1 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |

| Run #3 | 1040 ml 1.0 ml | | | | | |
|------------------------------------|--|--|----------------------|-----------------------|----------------------|-------------------------------|
| CAS No. | Compound | Result | RL | MDL | Units | Q |
| 56-55-3 123-91-1 91-20-3 | Benzo(a)anthracene 1,4-Dioxane Naphthalene | ND c | 0.19 0.32 0.96 | 0.038 0.16 0.38 | ug/l ug/l ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Run | #3 | Limits |
| 4165-60-0 321-60-8 1718-51-0 | Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 | 69% ^d 72% ^d 56% ^d | 83% 71% 74% | 76% 65% 69% | d | 42-108% 40-106% 39-121% |

Final Volume

1.0 ml

1.0 ml

- (a) Sample re-extracted beyond hold time; re-extract results reported due to suspected laboratory contamination in original extract.
- (b) Confirmation run.
- (c) Result is from Run# 2
- (d) Surrogate recoveries corrected for actual spike amount.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: FB030117 Lab Sample ID: FA41752-3

Matrix: Method:

AO - Field Blank Water

MADEP VPH REV 1.1

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

Project:

BMSMC, Humacao, PR

Run #1

File ID DF UU019249.D 1

Analyzed 03/09/17

Ву AJC

Prep Date n/a

Prep Batch n/a

Analytical Batch GUU1012

Run #2

Purge Volume

Run #1 Run #2

460-00-4

5.0 ml

MADEP VPH List

CAS No. Compound Result

RL

100

MDL

Units

Q

C9- C10 Aromatics (Unadj.)

ND

35

ug/l

CAS No. Surrogate Recoveries

BFB

Run#2 Run#1

Limits

460-00-4 **BFB**

110% 106%

70-130% 70-130%



E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

Client Sample ID: FB030117

Lab Sample ID: FA41752-3

Matrix: Method: AQ - Field Blank Water

MADEP EPH REV 1.1 SW846 3510C

BMSMC, Humacao, PR

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

File ID DF Analyzed Prep Date Prep Batch **Analytical Batch** By 03/06/17 Run #1 NN017761.D 1 03/10/17 MG OP64057 **GNN896**

Run #2

Project:

Initial Volume Final Volume

Run #1 1040 ml

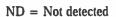
Run #2

2.0 ml

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|--------|-------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 190 | 77 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limi | ts | |
| 3386-33-2 | 1-Chlorooctadecane | 68% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 96% | | 40-1 | 40% | |
| 84-15-1 | o-Terphenyl | 84% | | 40-1 | 40% | |
| 321-60-8 | 2-Fluorobiphenyl | 96% | | 40-14 | 40% | |





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: FB030117 Lab Sample ID:

FA41752-3

Matrix:

AQ - Field Blank Water

SW846 8081B SW846 3510C

Date Sampled: 03/01/17 Date Received:

03/03/17

Method: Project:

BMSMC, Humacao, PR

Percent Solids: n/a

Run #1

File ID TT381289.D DF 1

By MV Prep Date 03/06/17

Prep Batch OP64048

Analytical Batch GTT1925

Run #2

Run #1

CAS No.

Initial Volume

1050 ml

5.0 ml

Final Volume

Run #2

Compound

Result

Analyzed

03/11/17

RL

MDL

Units

Q

ug/l

60-57-1 Dieldrin

ND

0.0095 0.0023

CAS No. Surrogate Recoveries Run#1

Run#2

Limits

877-09-8 2051-24-3

Tetrachloro-m-xylene Decachlorobiphenyl

81% 60% 42-127% 27-127%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit **E** = Indicates value exceeds calibration range J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-1D Lab Sample ID: FA41752-4 Matrix:

AQ - Ground Water Method: SW846 8260C Project:

BMSMC; Humacao, PR

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

| Run #1 | File ID 146059.D | DF 1 | Analyzed 03/07/17 14:34 | By WV | Prep Date | Prep Batch | Analytical Batch VI1286 |
|--------|---------------------|---------|----------------------------|----------|-----------|------------|----------------------------|
| Run #2 | | | | ••• | | 11/4 | V11260 |

| Run #1 Run #2 | Purge Volume 5.0 ml | | | | | | |
|------------------|------------------------|--------|----|-----|-----|--|--|
| CAS No. | Compound | Result | Dī | MDI | T.T | | |

| 0.15 110. | Compound | Kesun | KL | MDL | Units |
|------------|-------------------------|--------|--------|------|--------------|
| 71-43-2 | Benzene | ND | 1.0 | 0.31 | ug/l |
| 67-66-3 | Chloroform | ND | 1.0 | 0.30 | ug/I ug/I |
| 75-71-8 | Dichlorodifluoromethane | ND | 2.0 | 0.50 | ug/l |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.31 | ug/l |
| 87-68-3 | Hexachlorobutadiene | ND | 2.0 | 0.30 | ug/l |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.23 | ug/l |
| 75-85-4 | Tert-Amyl Alcohol | ND | 20 | 5.3 | ug/l |
| 75-01-4 | Vinyl Chloride | ND | 1.0 | 0.41 | ug/l |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its |
| 1868-53-7 | Dibromofluoromethane | 100% | | 83-1 | 18% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 107% | | | 25% |
| 2037-26-5 | Toluene-D8 | 102% | | | 12% |
| 460-00-4 | 4-Bromofluorobenzene | 97% | | 83-1 | |





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

| Client Sample ID: | OSMW-1D |
|-------------------|-----------|
| Lab Sample ID: | FA41752-4 |

52-4 AQ - Ground Water Date Sampled: 03/01/17 Date Received: 03/03/17

Matrix: Method:

SW846 8270D SW846 3510C

Percent Solids: n/a

Project: BMSMC, Humacao, PR

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|------------------|------------|----|----------|----|-----------|------------|------------------|
| Run #1 Run #2 | L0690377.D | 1 | 03/09/17 | NG | 03/08/17 | OP64081 | SL3965 |

| Run #1 Run #2 | Initial Volume 1050 ml | Final Volur 1.0 ml | ne | | | | |
|------------------|---------------------------|-----------------------|--------|------|--------|-------|---|
| CAS No. | Compound | | Result | RL | MDL | Units | Q |
| 100-52-7 | Benzaldehyde | | ND | 24 | 4.8 | ug/l | |
| 117-81-7 | bis(2-Ethylhexy | l)phthalate | ND | 4.8 | 0.95 | ug/l | |
| CASNo | Successite Peco | vieries | Dun# 1 | Dun# | 2 T im | ite | |

| CAB No. | Buil ogaic Recoveries | Kum I | Kuli# Z | Limits |
|-----------|-----------------------|-------|---------|---------|
| 4165-60-0 | Nitrobenzene-d5 | 73% | | 42-108% |
| 321-60-8 | 2-Fluorobiphenyl | 69% | | 40-106% |
| 1718-51-0 | Terphenyl-d14 | 57% | | 39-121% |
| | | | | |

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Run #1

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-1D Date Sampled: 03/01/17 Lab Sample ID: FA41752-4 Matrix: Date Received: 03/03/17 AQ - Ground Water Method: Percent Solids: n/a SW846 8270D BY SIM SW846 3510C

Project: BMSMC, Humacao, PR

Initial Volume

1050 ml

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|--------|-----------|-----|----------|----|-----------|------------|------------------|
| Run #1 | W097853.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 | U060357.D | 100 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |

0% b

39-121%

| Run #2 | 1050 ml 1.0 r | nl | | | | |
|--------------------------------|--|-----------------------------------|--------------------|---------------------|----------------------|---|
| CAS No. | Compound | Result | RL | MDL | Units | Q |
| 56-55-3 123-91-1 91-20-3 | Benzo(a)anthracene 1,4-Dioxane Naphthalene | ND 795 a ND | 0.19 29 0.95 | 0.038 14 0.38 | ug/l ug/l ug/l | В |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | nits | |
| 4165-60-0 321-60-8 | Nitrobenzene-d5 2-Fluorobiphenyl | 57% ^c 61% ^c | 0% b | | 108% 106% | |

43% c

Final Volume

1.0 ml

(a) Result is from Run# 2

1718-51-0

(b) Outside control limits due to dilution.

Terphenyl-d14

(c) Surrogate recoveries corrected for actual spike amount.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Page 1 of 1

Report of Analysis

Client Sample ID: OSMW-1D

Lab Sample ID:

FA41752-4

Matrix: Method:

AQ - Ground Water MADEP VPH REV 1.1

Date Sampled: 03/01/17 Date Received: 03/03/17

Percent Solids: n/a

Project:

BMSMC, Humacao, PR

DF

1

Run #1

File ID UU019250.D

Analyzed 03/09/17

By AJC Prep Date n/a

Prep Batch n/a

Analytical Batch GUU1012

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

MADEP VPH List

CAS No. Compound Result

RL

100

MDL

Units

Q

C9- C10 Aromatics (Unadj.)

ND

35

ug/l

CAS No. Surrogate Recoveries

Run#2 Run#1

Limits

460-00-4 **BFB** 460-00-4 **BFB**

109% 107% 70-130% 70-130%



MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-1D Lab Sample ID:

FA41752-4

AQ - Ground Water

Date Sampled: 03/01/17 Date Received: 03/03/17

Matrix: Method:

MADEP EPH REV 1.1 SW846 3510C

Percent Solids: n/a

Project:

BMSMC, Humacao, PR

File ID DF Analyzed Prep Date Prep Batch **Analytical Batch** Ву Run #1 NN017762.D 1 03/10/17 MG 03/06/17 OP64057 **GNN896**

Run #2

Initial Volume Final Volume

1000 ml

Run #1 Run #2 2.0 ml

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|--------|------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 200 | 80 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 3386-33-2 | 1-Chlorooctadecane | 73% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 118% | | 40-1 | 40% | |
| 84-15-1 | o-Terphenyl | 95% | | 40-1 | 40% | |
| 321-60-8 | 2-Fluorobiphenyl | 116% | | 40-1 | 40% | |





MDL = Method Detection Limit

N = Indicates presumptive evidence of a compound



E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-1D Lab Sample ID: FA41752-4

Matrix: Method:

AQ - Ground Water

1

SW846 8081B SW846 3510C

Date Sampled: 03/01/17 Date Received:

03/03/17 Percent Solids: n/a

Project: BMSMC, Humacao, PR

File ID DF

Analyzed Prep Date Prep Batch **Analytical Batch** By 03/11/17 MV 03/06/17 OP64048 GTT1925

Run #1 Run #2

Initial Volume Final Volume Run #1 1050 ml 5.0 ml

TT381290.D

Run #2

RL CAS No. Compound Result MDL Units Q

60-57-1 Dieldrin ND 0.0095 0.0023 ug/l

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

877-09-8 87% Tetrachloro-m-xylene 42-127% 2051-24-3 Decachlorobiphenyl 99% 27-127%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Ву

n/a

Page 1 of 1

Client Sample ID: EB030217 Lab Sample ID: FA41752-5

File ID

146060.D

Matrix: AQ - Equipment Blank Method: SW846 8260C

Project: BMSMC; Humacao, PR

DF

1

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Q

Prep Date Prep Batch **Analytical Batch** n/a VI1286

Purge Volume Run #1 5.0 ml

Run #2

Run #1

Run #2

| CAS No. | Compound | Result | RL | MDL | Units | |
|------------|-------------------------|--------|--------|------|-------|--|
| 71-43-2 | Benzene | ND | 1.0 | 0.31 | ug/l | |
| 67-66-3 | Chloroform | ND | 1.0 | 0.30 | ug/l | |
| 75-71-8 | Dichlorodifluoromethane | ND | 2.0 | 0.50 | ug/l | |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.31 | ug/l | |
| 87-68-3 | Hexachlorobutadiene | ND | 2.0 | 0.30 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.23 | ug/l | |
| 75-85-4 | Tert-Amyl Alcohol | ND | 20 | 5.3 | ug/l | |
| 75-01-4 | Vinyl Chloride | ND | 1.0 | 0.41 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 1868-53-7 | Dibromofluoromethane | 101% | | 83-1 | 18% | |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 107% | | | 25% | |
| 2037-26-5 | Toluene-D8 | 101% | | | 12% | |
| 460-00-4 | 4-Bromofluorobenzene | 97% | | 83-1 | | |

Analyzed

03/07/17 14:58 WV



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank





CAS No.

Report of Analysis

Page 1 of 1

Client Sample ID: EB030217 Lab Sample ID: FA41752-5

Matrix: AQ - Equipment Blank

Method: Project: BMSMC, Humacao, PR

SW846 8270D SW846 3510C

Date Sampled: 03/02/17 Date Received: 03/03/17 Percent Solids: n/a

File ID DF Analyzed By Prep Date Prep Batch **Analytical Batch** Run #1 L0690378.D 03/09/17 NG 03/08/17 OP64081 SL3965 1 Run #2

RL

MDL

Units

Q

Initial Volume Final Volume Run #1 1040 ml 1.0 ml Run #2

Compound

100-52-7 Benzaldehyde ND 24 4.8 ug/l 117-81-7 bis(2-Ethylhexyl)phthalate ND 4.8 0.96 ug/l

Result

CAS No. Run#1 Run#2 Surrogate Recoveries Limits 72% 4165-60-0 Nitrobenzene-d5 42-108% 321-60-8 2-Fluorobiphenyl 67% 40-106% 1718-51-0 Terphenyl-d14 67% 39-121%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Client Sample ID: EB030217 Lab Sample ID: FA41752-5 Matrix:

Initial Volume

2-Fluorobiphenyl

Terphenyl-d14

1040 ml

AQ - Equipment Blank

SW846 8270D BY SIM SW846 3510C

Final Volume

1.0 ml

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Method: Project:

Run #1

321-60-8

1718-51-0

BMSMC, Humacao, PR

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|----------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 | W097854.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 a | U060370.D | 1 | 03/14/17 | NJ | 03/11/17 | OP64133 | SU2649 |
| Run #3 b | U060354.D | 1 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |

| Run #2 Run #3 | 950 ml 1040 ml | 1.0 ml 1.0 ml | | | | | |
|------------------|-------------------|------------------|--------|--------|-------|-------|---------|
| CAS No. | Compound | | Result | RL | MDL | Units | Q |
| 56-55-3 | Benzo(a)anth | racene | ND | 0.19 | 0.038 | ug/l | |
| 123-91-1 | 1,4-Dioxane | | ND c | 0.32 | 0.16 | ug/l | |
| 91-20-3 | Naphthalene | | ND | 0.96 | 0.38 | ug/l | |
| CAS No. | Surrogate R | ecoveries | Run# 1 | Run# 2 | Run | # 3 | Limits |
| 4165-60-0 | Nitrobenzene | e-d5 | 54% d | 85% | 64% | d | 42-108% |

61% d

54% d

(a) Sample re-extracted beyond hold time; re-extract results reported due to suspected laboratory contamination in original extract.

73%

80%

- (b) Confirmation run.
- (c) Result is from Run# 2
- (d) Surrogate recoveries corrected for actual spike amount.



40-106%

39-121%

56% d

66% d

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: EB030217

Lab Sample ID:

FA41752-5

Matrix: Method: AQ - Equipment Blank

MADEP VPH REV 1.1

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids:

Project:

BMSMC, Humacao, PR

File ID DF Prep Batch **Analytical Batch** Analyzed By Prep Date UU019251.D 1 03/09/17 AJC n/a **GUU1012**

n/a

Run #1 Run #2

Purge Volume

5.0 ml

Run #1

Run #2

MADEP VPH List

CAS No. Compound Result RL **MDL** Units Q

> C9- C10 Aromatics (Unadj.) ND 100 35 ug/l

CAS No. Surrogate Recoveries Run#2 Limits Run#1

460-00-4 70-130% BFB 109% 460-00-4 **BFB** 105% 70-130%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: EB030217 Lab Sample ID: FA41752-5

Matrix:

AQ - Equipment Blank MADEP EPH REV 1.1 SW846 3510C Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Project:

Method:

BMSMC, Humacao, PR

Analytical Batch File ID DF Analyzed By Prep Date Prep Batch NN017763.D 03/10/17 MG 03/06/17 OP64057 **GNN896** Run #1 1

Run #2

Initial Volume Final Volume 1000 ml 2.0 ml

Run #1

Run #2

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|--------|------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 200 | 80 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 3386-33-2 | 1-Chlorooctadecane | 67% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 95% | | 40-1 | 40% | |
| 84-15-1 | o-Terphenyl | 80% | | 40-1 | 40% | |
| 321-60-8 | 2-Fluorobiphenyl | 95% | | 40-1 | 40% | |





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: EB030217 Lab Sample ID:

File ID

TT381291.D

Compound

FA41752-5

AQ - Equipment Blank

Date Sampled: 03/02/17 Date Received: 03/03/17

Matrix: Method:

SW846 8081B SW846 3510C

Analyzed

03/11/17

Percent Solids: n/a

OP64048

Project:

BMSMC, Humacao, PR

DF

1

Analytical Batch Prep Batch

GTT1925

Run #1 Run #2

Initial Volume Final Volume Run #1 1000 ml 5.0 ml

Run #2

CAS No.

Result RL **MDL** Units Q

Ву

MV

Prep Date

03/06/17

60-57-1 Dieldrin ND 0.010 0.0024ug/l

CAS No. Run#1 Run#2 Surrogate Recoveries Limits

877-09-8 72% Tetrachloro-m-xylene 42-127% 34% 2051-24-3 Decachlorobiphenyl 27-127%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-3S Lab Sample ID: FA41752-6

Matrix: Method:

Project:

AQ - Ground Water SW846 8260C BMSMC; Humacao, PR Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

File ID DF Analyzed Ву Prep Date Prep Batch Analytical Batch Run #1 I46063.D 1 03/07/17 16:07 WV n/a n/a VI1286 Run #2

| Run #1 Run #2 | Purge Volume 5.0 ml | |
|------------------|------------------------|--|
| | | |

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|---|--|--|---|---|--|----|
| 71-43-2 67-66-3 75-71-8 107-06-2 87-68-3 1634-04-4 75-85-4 75-01-4 | Benzene Chloroform Dichlorodifluoromethane 1,2-Dichloroethane Hexachlorobutadiene Methyl Tert Butyl Ether Tert-Amyl Alcohol Vinyl Chloride | ND ND ND ND 0.53 ND ND | 1.0 1.0 2.0 1.0 2.0 1.0 20 1.0 | 0.31 0.30 0.50 0.31 0.30 0.23 5.3 0.41 | ug/l ug/l ug/l ug/l ug/l ug/l ug/l | JВ |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 1868-53-7 17060-07-0 2037-26-5 460-00-4 | Dibromofluoromethane 1,2-Dichloroethane-D4 Toluene-D8 4-Bromofluorobenzene | 101% 106% 100% 98% | | 83-1 79-1 85-1 83-1 | 25% 12% | |

(a) Suspected laboratory contaminant.





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-3S Lab Sample ID: FA41752-6

Matrix:

AQ - Ground Water

Method: Project:

SW846 8270D SW846 3510C

BMSMC, Humacao, PR

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Ву **Analytical Batch** File ID DF Analyzed Prep Date Prep Batch NG Run #1 SL3965 L0690379.D 03/09/17 03/08/17 OP64081

Run #2

Initial Volume Final Volume Run #1 1050 ml 1.0 ml

Run #2

| CAS No. | Compound | Result | RL | MDL | Units | Q | |
|-----------|----------------------------|--------|--------|---------|-------|---|--|
| 100-52-7 | Benzaldehyde | ND | 24 | 4.8 | ug/l | | |
| 117-81-7 | bis(2-Ethylhexyl)phthalate | ND | 4.8 | 0.95 | ug/l | | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limits | | | |
| 4165-60-0 | Nitrobenzene-d5 | 82% | | 42-108% | | | |
| 321-60-8 | 2-Fluorobiphenyl | 76% | | 40-106% | | | |
| 1718-51-0 | Terphenyl-d14 | 61% | | 39-121% | | | |



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Page 1 of 1

SGS Accutest

Report of Analysis

Client Sample ID: OSMW-3S Lab Sample ID: FA41752-6

Matrix: Method: AQ - Ground Water

SW846 8270D BY SIM SW846 3510C

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids:

Project:

BMSMC, Humacao, PR

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|----------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 | W097855.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 a | U060347.D | 1 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |
| Run #3 b | U060472.D | 1 | 03/20/17 | NJ | 03/18/17 | OP64229 | SU2652 |

| Run #1 Run #2 Run #3 | Initial Volume 1050 ml 1050 ml 900 ml | Final Volum 1.0 ml 1.0 ml 1.0 ml | ne | | | | |
|----------------------------|--|---|--------|------|-------|-------|---|
| CAS No. | Compound | | Result | RL | MDL | Units | Q |
| 56-55-3 | Benzo(a)anthra | cene | ND | 0.19 | 0.038 | ug/l | |

0.29

| 91-20-3 | Naphthalene | ND | 0.95 | 0.38 աչ | g/l |
|------------------------------------|--|--|--|-------------------|-------------------------------|
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Run# 3 | Limits |
| 4165-60-0 321-60-8 1718-51-0 | Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 | 65% ^d 70% ^d 47% ^d | 73% ^d 63% ^d 59% ^d | 78% 69% 90% | 42-108% 40-106% 39-121% |

2.4 c

(a) Confirmed by re-extraction and reanalysis.

1,4-Dioxane

(b) Confirmation run.

123-91-1

- (c) Result is from Run# 2
- (d) Surrogate recoveries corrected for actual spike amount.



ug/l

B

0.14

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-3S

Lab Sample ID: FA41752-6

Matrix: Method: AQ - Ground Water MADEP VPH REV 1.1

Project:

BMSMC, Humacao, PR

Date Sampled: 03/02/17

Date Received: 03/03/17 Percent Solids: n/a

File ID DF Analyzed By Prep Date Prep Batch Analytical Batch Run #1 UU019252.D 1 03/09/17 AJC n/a n/a GUU1012

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

MADEP VPH List

CAS No. Compound Result RL MDL Units Q

C9- C10 Aromatics (Unadj.) ND 100 35 ug/l

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

 460-00-4
 BFB
 109%
 70-130%

 460-00-4
 BFB
 104%
 70-130%





MDL = Method Detection Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Page 1 of 1

SGS Accutest

Report of Analysis

Client Sample ID: OSMW-3S

Lab Sample ID: FA41752-6 Matrix: AQ - Ground Water

1000 ml

Method:

MADEP EPH REV 1.1 SW846 3510C

Project: BMSMC, Humacao, PR Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Analytical Batch File ID DF Analyzed By Prep Date Prep Batch 03/06/17 OP64057 **GNN896** Run #1 NN017764.D 1 03/10/17 MG

Run #2

Initial Volume Final Volume

Run #1 Run #2

2.0 ml

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|--------|------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 200 | 80 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limi | its | |
| 3386-33-2 | 1-Chlorooctadecane | 57% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 99% | | 40-1 | 40% | |
| 84-15-1 | o-Terphenyl | 81% | | 40-1 | 40% | |
| 321-60-8 | 2-Fluorobiphenyl | 100% | | 40-1 | 40% | |



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-3S

Lab Sample ID: Matrix:

FA41752-6

AQ - Ground Water

SW846 8081B SW846 3510C

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Q

Project: BMSMC, Humacao, PR

File ID **Analytical Batch** DF Analyzed By Prep Date Prep Batch Run #1 TT381292.D 1 03/11/17 MV 03/06/17 OP64048 GTT1925

Run #2

Method:

Initial Volume Final Volume 1020 ml 5.0 ml

Run #1 Run #2

CAS No. Compound

Result RL MDL Units

60-57-1 Dieldrin ND 0.0098 0.0023 ug/I

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

877-09-8 Tetrachloro-m-xylene 2051-24-3 Decachlorobiphenyl

85% 92% 42-127% 27-127%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Ву

n/a

Page 1 of 1

Client Sample ID: OSMW-3D Lab Sample ID: FA41752-7

File ID

I46064.D

Matrix: AQ - Ground Water Method: SW846 8260C

Date Sampled: 03/02/17 Date Received: 03/03/17 Percent Solids: n/a

Q

Project: BMSMC; Humacao, PR

DF

1

Analyzed

03/07/17 16:30 WV

Prep Date Prep Batch **Analytical Batch** n/a VI1286

Run #1 Run #2

Purge Volume Run #1 5.0 ml

Run #2

| CAS No. | Compound | Result | RL, | MDL | Units |
|------------|-------------------------|--------|--------|------|-------|
| 71-43-2 | Benzene | ND | 1.0 | 0.31 | ug/l |
| 67-66-3 | Chloroform | ND | 1.0 | 0.30 | ug/l |
| 75-71-8 | Dichlorodifluoromethane | ND | 2.0 | 0.50 | ug/l |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.31 | ug/l |
| 87-68-3 | Hexachlorobutadiene | ND | 2.0 | 0.30 | ug/l |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.23 | ug/l |
| 75-85-4 | Tert-Amyl Alcohol | ND | 20 | 5.3 | ug/l |
| 75-01-4 | Vinyl Chloride | ND | 1.0 | 0.41 | ug/l |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | - |
| 1868-53-7 | Dibromofluoromethane | 99% | | 83-1 | 1994 |
| 17060-07-0 | 1.2-Dichloroethane-D4 | 106% | | 79-1 | |
| 2037-26-5 | Toluene-D8 | 104% | | 85-1 | |
| 460-00-4 | 4-Bromofluorobenzene | 100% | | 83-1 | |
| | | | | | |





ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

CAS No.

4165-60-0

321-60-8

1718-51-0

Surrogate Recoveries

Nitrobenzene-d5

2-Fluorobiphenyl

Terphenyl-d14

Report of Analysis

Page 1 of 1

| Client San Lab Samp Matrix: Method: Project: | le ID: FA4179 AQ - G SW846 | 52-7 round Wat | W846 3510C | | | Date | | 3/02/17 3/03/17 a |
|--|----------------------------------|-------------------|----------------------|-----------|-------------------|--------------|-----------------------|----------------------------|
| Run #1 Run #2 | File ID L0690380.D | DF 1 | Analyzed 03/09/17 | By NG | Prep D 03/08/1 | | Prep Batch OP64081 | Analytical Batch SL3965 |
| Run #1 Run #2 | Initial Volume 1040 ml | Final Vo | lume | | | | | |
| CAS No. | Compound | | Result | RL | MDL | Units | Q | |
| 100-52-7 117-81-7 | Benzaldehyde bis(2-Ethylhex | yl)phthalate | ND ND | 24 4.8 | 4.8 0.96 | ug/l ug/l | | |

Run#2

Run#1

74%

71%

62%



Limits

42-108%

40-106%

39-121%

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

| nt Sample ID: | OSMW-3D | | | |
|---------------|---|------------------------|---|--|
| Sample ID: | FA41752-7 | | Date Sampled: | 03/02/17 |
| rix: | AQ - Ground Water | | Date Received: | 03/03/17 |
| hod: | SW846 8270D BY SIM | SW846 3510C | Percent Solids: | n/a |
| | nt Sample ID: Sample ID: rix: hod: | rix: AQ - Ground Water | Sample ID: FA41752-7 rix: AQ - Ground Water | Sample ID: FA41752-7 Date Sampled: rix: AQ - Ground Water Date Received: |

Project: BMSMC, Humacao, PR

Initial Volume

Final Volume

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|----------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 | W097856.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 a | U060348.D | 1 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |

| | 0 ml 0 ml | | | | |
|----------------------------|--------------|--------|-------|-------|---|
| CAS No. Compound | Result | RL | MDL | Units | Q |
| 56-55-3 Benzo(a)anthracend | | 0.19 | 0.038 | ug/l | |
| 123-91-1 1,4-Dioxane | 2.6 b | 0.29 | 0.14 | ug/l | В |
| 91-20-3 Naphthalene | ND | 0.96 | 0.38 | ug/l | |
| CAS No. Surrogate Recover | ries Run# 1 | Run# 2 | Lim | its | |
| 4165-60-0 Nitrobenzene-d5 | 58% c | 62% c | 42-1 | 08% | |
| 321-60-8 2-Fluorobiphenyl | 59% c | 55% c | 40-1 | 06% | |

56% c

45% c

(a) Insufficient sample for re-extraction.

Terphenyl-d14

(b) Result is from Run# 2

1718-51-0

(c) Surrogate recoveries corrected for actual spike amount.



39-121%

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-3D

Lab Sample ID: FA41752-7

Matrix: Method: Project: AQ - Ground Water MADEP VPH REV 1.1

BMSMC, Humacao, PR

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

File ID DF Analyzed By Prep Date Prep Batch Analytical Batch
Run #1 UU019253.D 1 03/09/17 AJC n/a n/a GUU1012

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

MADEP VPH List

CAS No. Compound Result RL MDL Units Q

C9- C10 Aromatics (Unadj.) ND 100 35 ug/l

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

 460-00-4
 BFB
 109%
 70-130%

 460-00-4
 BFB
 105%
 70-130%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-3D Lab Sample ID:

FA41752-7

AQ - Ground Water MADEP EPH REV 1.1 SW846 3510C Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Method: Project:

BMSMC, Humacao, PR

Analytical Batch File ID DF Analyzed By Prep Date Prep Batch **GNN896** Run #1 NN017765.D 1 03/10/17 MG 03/06/17 OP64057

Run #2

Matrix:

Initial Volume Final Volume

Run #1 Run #2

1040 ml

2.0 ml

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|--------|------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 190 | 77 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limi | its | |
| 3386-33-2 | 1-Chlorooctadecane | 54% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 109% | | 40-1 | 40% | |
| 84-15-1 | o-Terphenyl | 86% | | 40-1 | 40% | |
| 321-60-8 | 2-Fluorobiphenyl | 106% | | 40-1 | 40% | |



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Lab Sample ID:

Client Sample ID: OSMW-3D

FA41752-7

Matrix: Method: AQ - Ground Water

SW846 8081B SW846 3510C

Project:

BMSMC, Humacao, PR

Date Sampled: 03/02/17

Date Received: 03/03/17

Percent Solids: n/a

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|--------|------------|----|----------|----|-----------|------------|------------------|
| Run #1 | TT381293.D | 1 | 03/11/17 | MV | 03/06/17 | OP64048 | GTT1925 |

Run #2

Final Volume Initial Volume

Run #1 Run #2 1050 ml

5.0 ml

Compound

Result

RL

MDL

Units

Q

60-57-1

CAS No.

Dieldrin

ND

0.0095 0.0023 ug/l

CAS No.

Surrogate Recoveries

Run#1

Run#2

Limits

877-09-8 2051-24-3

Tetrachloro-m-xylene Decachlorobiphenyl

101% 110% 42-127% 27-127%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page I of 1

Client Sample ID: FB030217

FA41752-8

Lab Sample ID: Matrix:

AQ - Ground Water

Method: Project:

SW846 8260C BMSMC; Humacao, PR Date Sampled: Date Received:

03/02/17 03/03/17

Percent Solids: n/a

File ID Run #1 I46065.D Run #2

DF 1

Analyzed Ву 03/07/17 16:52 WV

Prep Date n/a

Prep Batch

Analytical Batch VI1286

Purge Volume

Run #1

5.0 ml

Toluene-D8

4-Bromofluorobenzene

Run #2

2037-26-5

460-00-4

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|------------|-------------------------|--------|--------|------|-------|---|
| 71-43-2 | Benzene | ND | 1.0 | 0.31 | ug/l | |
| 67-66-3 | Chloroform | ND | 1.0 | 0.30 | ug/l | |
| 75-71-8 | Dichlorodifluoromethane | ND | 2.0 | 0.50 | ug/l | |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.31 | ug/l | |
| 87-68-3 | Hexachlorobutadiene | ND | 2.0 | 0.30 | ug/l | |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.23 | ug/l | |
| 75-85-4 | Tert-Amyl Alcohol | ND | 20 | 5.3 | ug/l | |
| 75-01-4 | Vinyl Chloride | ND | 1.0 | 0.41 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 1868-53-7 | Dibromofluoromethane | 98% | | 92_1 | 18% | |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 106% | | | 25% | |
| 0007.00.5 | 77 d | 10070 | | 19-1 | ZJ /0 | |

101%

102%

83-118% luel Infante Mendez LIC # 180

85-112%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank N = Indicates presumptive evidence of a compound

321-60-8

1718-51-0

Report of Analysis

Page 1 of 1

| Client Sam Lab Sampl Matrix: Method: | _ | SW846 | 52-8 round Water 8270D SV | V846 3510C | | | Date | Received: | 03/02/17 03/03/17 n/a |
|---|-------------------|----------------------|---------------------------------|--------------------------|-----------|-------------------|--------------|-----------------------|-----------------------------|
| Project: | | BWSW | C, Humaca | o, PK | | | | | |
| Run #1 Run #2 | File ID L06903 | | DF 1 | Analyzed 03/09/17 | By NG | Prep D 03/08/1 | | Prep Batch OP64081 | Analytical Batch SL3965 |
| Run #1 Run #2 | Initial 1050 m | Volume il | Final Vol | ume | | | | | |
| CAS No. | Comp | ound | | Result | RL | MDL | Units | Q | |
| 100-52-7 117-81-7 | | ldehyde Ethylhexy | yl)phthalate | ND ND | 24 4.8 | 4.8 0.95 | ug/l ug/l | | |
| CAS No. | Surro | gate Rec | overies | Run# 1 | Run# 2 | Lim | its | | |
| 4165-60-0 | Nitrob | enzene-d | !5 | 80% | | 42-1 | .08% | | |

77%

72%



40-106%

39-121%

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

2-Fluorobiphenyl

Terphenyl-d14

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Run #1

Report of Analysis

Page 1 of 1

Client Sample ID: FB030217 Lab Sample ID: FA41752-8 Date Sampled: 03/02/17 Matrix: Date Received: AQ - Ground Water 03/03/17 Method: Percent Solids: n/a SW846 8270D BY SIM SW846 3510C

Project: BMSMC, Humacao, PR

Initial Volume

1050 ml

Final Volume

1.0 ml

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|----------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 | W097857.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 a | U060371.D | 1 | 03/14/17 | NJ | 03/11/17 | OP64133 | SU2649 |
| Run #3 b | U060349.D | 1 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |

| Run #2 Run #3 | 1000 ml 1050 ml | 1.0 ml 1.0 ml | | | | | |
|------------------|--------------------|------------------|--------|--------|-------|-------|--------|
| CAS No. | Compound | | Result | RL | MDL | Units | Q |
| 56-55-3 | Benzo(a)anth | racene | ND | 0.19 | 0.038 | ug/l | |
| 23-91-1 | 1,4-Dioxane | | ND c | 0.30 | 0.15 | ug/l | |
| 91-20-3 | Naphthalene | | ND | 0.95 | 0.38 | ug/l | |
| CAS No. | Surrogate Re | ecoveries | Run# 1 | Run# 2 | Run | # 3 | Limits |
| | | | | | | | |

4165-60-0 Nitrobenzene-d5 60% d 79% 73% d 42-108% 321-60-8 2-Fluorobiphenyl 72% d 72% 64% d 40-106% 69% d 1718-51-0 54% d 79% 39-121% Terphenyl-d14

(a) Sample re-extracted beyond hold time; re-extract results reported due to suspected laboratory contamination in original extract.

(b) Confirmation run.

(c) Result is from Run# 2

(d) Surrogate recoveries corrected for actual spike amount.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: FB030217

Lab Sample ID: FA41752-8

Matrix:

AQ - Ground Water

Method:

MADEP VPH REV 1.1

BMSMC, Humacao, PR

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Project:

File ID Run #1

DF UU019254.D 1

Analyzed 03/09/17

By AJC Prep Date n/a

Prep Batch

Analytical Batch

GUU1012 n/a

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

MADEP VPH List

CAS No. Compound Result

RL

100

MDL

Units

Q

C9- C10 Aromatics (Unadj.)

ND

35

ug/l

CAS No. Surrogate Recoveries Run#1

Run#2

Limits

460-00-4 BFB **BFB** 460-00-4

110% 105% 70-130% 70-130%





B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

By

MG

Page 1 of 1

Client Sample ID: FB030217

Lab Sample ID: Matrix:

FA41752-8

AQ - Ground Water

Date Sampled:

03/02/17

Method:

MADEP EPH REV 1.1 SW846 3510C

03/10/17

Date Received: Percent Solids: n/a

03/03/17

Project:

BMSMC, Humacao, PR

1

File ID DF Analyzed

NN017766.D

1000 ml

Prep Date 03/06/17

Prep Batch OP64057

Analytical Batch GNN896

Run #1 Run #2

> Initial Volume Final Volume

Run #1

2.0 ml

Run #2

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|--------|-------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 200 | 80 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Limi | its | |
| 3386-33-2 | 1-Chlorooctadecane | 49% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 102% | | 40-14 | 40% | |
| 84-15-1 | o-Terphenyl | 85% | | 40-14 | 40% | |
| 321-60-8 | 2-Fluorobiphenyl | 102% | | 40-1 | 40% | |



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: FB030217 Lab Sample ID:

FA41752-8

AQ - Ground Water

SW846 8081B SW846 3510C

5.0 ml

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Project: BMSMC, Humacao, PR

File ID DF Analyzed Prep Date Prep Batch **Analytical Batch** By Run #1 TT381294.D 03/11/17 MV 03/06/17 OP64048 1 GTT1925

Run #2

Matrix:

Method:

Final Volume Initial Volume

Compound

Run #1 1040 ml

Run #2

CAS No.

Result RL **MDL** Units Q

60-57-1 Dieldrin ND 0.0096 0.0023 ug/l

CAS No. Run#1 Run#2 Surrogate Recoveries Limits

877-09-8 88% 42-127% Tetrachloro-m-xylene Decachlorobiphenyl 2051-24-3 56% 27-127%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-2S Lab Sample ID: FA41752-9 Matrix:

AQ - Ground Water Method: SW846 8260C Project: BMSMC; Humacao, PR Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

| | T" T | | | | | | |
|--------|----------|----|----------------|----|-----------|------------|------------------|
| Run #1 | File ID | DF | Analyzed | By | Prep Date | Prep Batch | Analytical Batch |
| Run #2 | 146066.D | 1 | 03/07/17 17:15 | WV | n/a | n/a | VI1286 |

| | 20 44 4 | |
|--------|--------------|--|
| 1 | Purge Volume | |
| Run #1 | 5.0 ml | |
| Run #2 | 310 1111 | |
| Kun #2 | | |
| | | |

| CAS No. | Compound | Result | RL | MDL | Unit |
|------------|-------------------------|--------|--------|------|------|
| 71-43-2 | Benzene | ND | 1.0 | 0.31 | ug/l |
| 67-66-3 | Chloroform | ND | 1.0 | 0.30 | ug/l |
| 75-71-8 | Dichlorodifluoromethane | ND | 2.0 | 0.50 | ug/l |
| 107-06-2 | 1,2-Dichloroethane | ND | 1.0 | 0.31 | ug/l |
| 87-68-3 | Hexachlorobutadiene | ND | 2.0 | 0.30 | ug/l |
| 1634-04-4 | Methyl Tert Butyl Ether | ND | 1.0 | 0.23 | ug/l |
| 75-85-4 | Tert-Amyl Alcohol | ND | 20 | 5.3 | ug/l |
| 75-01-4 | Vinyl Chloride | ND | 1.0 | 0.41 | ug/l |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its |
| 1868-53-7 | Dibromofluoromethane | 99% | | 83-1 | 18% |
| 17060-07-0 | 1,2-Dichloroethane-D4 | 108% | | 79-1 | |
| 2037-26-5 | Toluene-D8 | 104% | | 85-1 | |
| 460-00-4 | 4-Bromofluorobenzene | 101% | | 83-1 | |



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank





Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-2S Lab Sample ID: FA41752-9 Date Sampled: 03/02/17 Date Received: 03/03/17 Matrix: AQ - Ground Water Method: Percent Solids: n/a SW846 8270D SW846 3510C

Project: BMSMC, Humacao, PR

Prep Batch **Analytical Batch** File ID DF Analyzed By Prep Date Run #1 L0690382.D NG 03/08/17 OP64081 SL3965 03/09/17 1

Run #2

Initial Volume Final Volume Run #1 1020 ml 1.0 ml Run #2

| CAS No. | Compound | Result | RL | MDL | Units | |
|----------------------|--|----------|-----------|-------------|--------------|--|
| 100-52-7 117-81-7 | Benzaldehyde bis(2-Ethylhexyl)phthalate | ND ND | 25 4.9 | 4.9 0.98 | ug/l ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 4165-60-0 | Nitrobenzene-d5 | 85% | 1 | 42-1 | 08% | |
| 321-60-8 | 2-Fluorobiphenyl | 79% | | 40-1 | 06% | |
| 1718-51-0 | Terphenyl-d14 | 70% | | 39-1 | 21% | |



Q

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

| Client Sample ID: | OSMW-2S | | | |
|-------------------|---------------------------|-------------|-----------------|----------|
| Lab Sample ID: | FA41752-9 | | Date Sampled: | 03/02/17 |
| Matrix: | AQ - Ground Water | | Date Received: | 03/03/17 |
| Method: | SW846 8270D BY SIM | SW846 3510C | Percent Solids: | n/a |
| 4 | | | | |

Project: BMSMC, Humacao, PR

Initial Volume

Terphenyl-d14

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|--------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 | W097858.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 | U060355.D | 2 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |

69% b

39-121%

| 1 | Interest Columnia | 1 1101 / 010 | | | | | |
|-----------|-------------------|--------------|--------|--------|-------|-------|---|
| Run #1 | 1020 ml | 1.0 ml | | | | | |
| Run #2 | 1020 ml | 1.0 ml | | | | | |
| CAS No. | Compound | | Result | RL | MDL | Units | Q |
| 56-55-3 | Benzo(a)anthra | cene | ND | 0.20 | 0.039 | ug/l | |
| 123-91-1 | 1.4-Dioxane | | 28.0 a | 0.59 | 0.29 | ug/l | В |
| 91-20-3 | Naphthalene | | ND | 0.98 | 0.39 | ug/l | |
| CAS No. | Surrogate Reco | overies | Run# 1 | Run# 2 | Lim | its | |
| 4165-60-0 | Nitrobenzene-d | 5 | 64% b | 77% b | 42-1 | 08% | |
| 321-60-8 | 2-Fluorobiphen | yl | 75% b | 68% b | 40-1 | 06% | |

52% b

Final Volume

(a) Result is from Run# 2

1718-51-0

(b) Surrogate recoveries corrected for actual spike amount.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-2S

Lab Sample ID: FA41752-9

Matrix:

AQ - Ground Water

Method: Project:

MADEP VPH REV 1.1 BMSMC, Humacao, PR

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Prep Batch **Analytical Batch** File ID DF Analyzed Ву Prep Date Run #1 UU019255.D 1 03/09/17 AJC n/a **GUU1012** n/a

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

MADEP VPH List

RL **MDL** CAS No. Compound Result Units Q

> C9- C10 Aromatics (Unadj.) ND 100 35 ug/l

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

460-00-4 **BFB** 70-130% 109% **BFB** 460-00-4 104% 70-130%



E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

N = Indicates presumptive evidence of a compound

Report of Analysis

Ву

MG

Prep Date

03/06/17

Page 1 of 1

Client Sample ID: OSMW-2S

File ID

1000 ml

Lab Sample ID:

FA41752-9

AQ - Ground Water

Date Sampled: Date Received: 03/03/17

03/02/17

Matrix: Method:

MADEP EPH REV 1.1 SW846 3510C

Analyzed

03/10/17

Percent Solids: n/a

Project:

BMSMC, Humacao, PR

DF

1

Prep Batch **Analytical Batch** OP64057 **GNN896**

Run #1 Run #2

> Initial Volume **Final Volume**

> > 2-Fluorobiphenyl

NN017767.D

Run #1

321-60-8

Run #2

2.0 ml

MAEPH List

| CAS No. | Compound | Result | RL | MDL | Units | Q |
|-----------|----------------------------|--------|--------|------|-------|---|
| | C11-C22 Aromatics (Unadj.) | ND | 200 | 80 | ug/l | |
| CAS No. | Surrogate Recoveries | Run# 1 | Run# 2 | Lim | its | |
| 3386-33-2 | 1-Chlorooctadecane | 47% | | 40-1 | 40% | |
| 580-13-2 | 2-Bromonaphthalene | 117% | | 40-1 | 40% | |
| 84-15-1 | o-Terphenyl | 96% | | 40-1 | 40% | |

118%



40-140%



MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-2S Lab Sample ID: FA41752-9

Matrix:

AQ - Ground Water

Method: Project:

SW846 8081B SW846 3510C

BMSMC, Humacao, PR

Date Sampled: 03/02/17 Date Received:

03/03/17

Percent Solids: n/a

File ID DF Analyzed Prep Date Prep Batch **Analytical Batch** By Run #1 TT381295.D MV 1 03/11/17 03/06/17 OP64048 GTT1925

Run #2

Final Volume Initial Volume

Run #1 Run #2 1000 ml 5.0 ml

CAS No. Compound Result

RL MDL Units

ug/l

Q

60-57-1 Dieldrin ND 0.010 0.0024

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

877-09-8 Tetrachloro-m-xylene Decachlorobiphenyl 2051-24-3

86% 96% 42-127% 27-127%



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Report of Analysis

Page 1 of 1

Client Sample ID: Lab Sample ID:

OSMW-2D FA41752-10

Matrix: Method:

AQ - Ground Water SW846 8260C

Project:

BMSMC: Humacao, PR

Date Sampled: Date Received:

Q

03/02/17 03/03/17

Percent Solids:

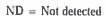
File ID DF Analyzed By Prep Date Prep Batch **Analytical Batch** Run #I 146067.D 1 03/07/17 17:38 WV n/a VI1286 n/a Run #2

Purge Volume Run #1 5.0 ml

Run #2

CAS No. Compound Result RL **MDL** Units 71-43-2 Benzene ND 1.0 0.31 ug/l 67-66-3 Chloroform ND 1.0 0.30 ug/l Dichlorodifluoromethane 75-71-8 ND 2.0 0.50 ug/l 107-06-2 1,2-Dichloroethane ND 1.0 0.31 ug/l Hexachlorobutadiene 87-68-3 ND 2.0 0.30 ug/l 1634-04-4 Methyl Tert Butyl Ether ND 1.0 0.23 ug/l 75-85-1 Tert-Amyl Alcohol ND 20 5.3 ug/I 75-01-4 Vinyl Chloride ND 1.0 0.41ug/l Surrogate Recoveries CAS No. Run#1 Run#2 Limits 1868-53-7 Dibromofluoromethane 101% 83-118% 17060-07-0 1,2-Dichloroethane-D4 107% 79-125% 2037-26-5 Toluene-D8 101% 85-112% 460-00-4 4-Bromofluorobenzene 97% 83-118%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank





321-60-8

1718-51-0

Report of Analysis

Page 1 of 1

| Client Sam Lab Sampl Matrix: Method: Project: | le ID: FA41752 AQ - Gro SW846 8 | -10 und Water | 846 3510C , PR | | | Date | Received: | 03/02/17 03/03/17 n/a |
|---|---------------------------------------|----------------------|----------------------|-----------|-------------------|--------------|-----------------------|-----------------------------|
| Run #1 Run #2 | | DF 1 | Analyzed 03/10/17 | By NG | Prep D 03/08/1 | | Prep Batch OP64081 | Analytical Batch SL3965 |
| Run #1 Run #2 | | Final Volu 1.0 ml | me | | | | | |
| CAS No. | Compound | | Result | RL | MDL | Units | Q | |
| 100-52-7 117-81-7 | Benzaldehyde bis(2-Ethylhexyl) | phthalate | ND ND | 24 4.8 | 4.8 0.95 | ug/l ug/l | | |
| CAS No. | Surrogate Recov | veries | Run# 1 | Run# 2 | Lim | its | | |
| 4165-60-0 | Nitrobenzene-d5 | | 77% | | 42-1 | 08% | | |

74%

63%



40-106% 39-121%

ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

2-Fluorobiphenyl

Terphenyl-d14

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Run #1

Report of Analysis

Page 1 of 1

| Client Sample ID: | OSMW-2D | | | |
|-------------------|--------------------|-------------|-----------------|----------|
| Lab Sample ID: | FA41752-10 | | Date Sampled: | 03/02/17 |
| Matrix: | AQ - Ground Water | | Date Received: | 03/03/17 |
| Method: | SW846 8270D BY SIM | SW846 3510C | Percent Solids: | n/a |
| l= = . | D1 401 40 41 DD | | | |

Project: BMSMC, Humacao, PR

Initial Volume

1050 ml

| | File ID | DF | Analyzed | Ву | Prep Date | Prep Batch | Analytical Batch |
|--------|-----------|----|----------|----|-----------|------------|------------------|
| Run #1 | W097859.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |
| Run #2 | U060356.D | 2 | 03/09/17 | NJ | 03/08/17 | OP64082 | SU2648 |

| Run #2 | 1050 ml | 1.0 ml | | | | | | |
|---------------------|----------------------------|--------|-------------------------|--------------|--------------|--------------|---|--|
| CAS No. | Compound | | Result | RL | MDL | Units | Q | |
| 56-55-3 | Benzo(a)ant | | ND | 0.19 | 0.038 | ug/l | _ | |
| 123-91-1 91-20-3 | 1,4-Dioxane Naphthalene | | 24.6 ^a ND | 0.57 0.95 | 0.29 0.38 | ug/l ug/l | В | |
| CAS No. | Surrogate I | | Run# 1 | Run# 2 | Lim | | | |
| | _ | | | | | | | |
| 4165-60-0 | Nitrobenzen | | 64% b | 73% b | | .08% | | |
| 321-60-8 | 2-Fluorobip | henyl | 71% b | 64% b | 40-1 | .06% | | |
| 1718-51-0 | Terphenyl-d | 14 | 48% b | 63% b | 39-1 | 21% | | |

Final Volume

1.0 ml

(a) Result is from Run# 2

(b) Surrogate recoveries corrected for actual spike amount.



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-2D

Lab Sample ID:

FA41752-10

Matrix:

AQ - Ground Water

Method: Project:

MADEP VPH REV 1.1

BMSMC, Humacao, PR

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Analytical Batch File ID DF Analyzed Ву Prep Date Prep Batch UU019258.D AJC GUU1012 Run #1 1 03/09/17 n/a n/a

Run #2

Purge Volume

Run #1 5.0 ml

Run #2

MADEP VPH List

CAS No. Compound Result RL MDL Units Q

> C9- C10 Aromatics (Unadj.) ND 100 35 ug/l

CAS No. Surrogate Recoveries Run#1 Run#2 Limits

70-130% 460-00-4 **BFB** 107% 460-00-4 **BFB** 105% 70-130%





MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-2D Lab Sample ID: FA41752-10

Matrix: Method:

AQ - Ground Water

MADEP EPH REV 1.1 SW846 3510C

Date Sampled: 03/02/17 Date Received: 03/03/17

Percent Solids: n/a

Project: BMSMC, Humacao, PR

File ID Run #1 NN017768.D DF Analyzed 1 03/10/17

Ву MG

Prep Date 03/06/17

Prep Batch **Analytical Batch** OP64057

GNN896

Run #2

Final Volume Initial Volume

Run #1 Run #2 1000 ml 2.0 ml

MAEPH List

| Compound | Result | RL | MDL | Units | Q |
|----------------------------|---|---|--|---|--|
| C11-C22 Aromatics (Unadj.) | ND | 200 | 80 | ug/l | |
| Surrogate Recoveries | Run# 1 | Run# 2 | Limi | its | |
| 1-Chlorooctadecane | 44% | | 40-1 | 40% | |
| 2-Bromonaphthalene | 94% | | 40-1 | 40% | |
| o-Terphenyl | 76% | | 40-1 | 40% | |
| 2-Fluorobiphenyi | 92% | | 40-1 | 40% | |
| | C11-C22 Aromatics (Unadj.) Surrogate Recoveries 1-Chlorooctadecane 2-Bromonaphthalene o-Terphenyl | C11-C22 Aromatics (Unadj.) ND Surrogate Recoveries Run# 1 1-Chlorooctadecane 44% 2-Bromonaphthalene 94% o-Terphenyl 76% | C11-C22 Aromatics (Unadj.) ND 200 Surrogate Recoveries Run# 1 Run# 2 1-Chlorooctadecane 44% 2-Bromonaphthalene 94% o-Terphenyl 76% | C11-C22 Aromatics (Unadj.) ND 200 80 Surrogate Recoveries Run# 1 Run# 2 Limit 1-Chlorooctadecane 44% 40-12 2-Bromonaphthalene 94% 40-12 0-Terphenyl 76% 40-13 | C11-C22 Aromatics (Unadj.) ND 200 80 ug/l Surrogate Recoveries Run# 1 Run# 2 Limits 1-Chlorooctadecane 44% 40-140% 40-140% o-Terphenyl 76% 40-140% |



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank



Report of Analysis

Page 1 of 1

Client Sample ID: OSMW-2D

Lab Sample ID:

FA41752-10

Matrix: Method: AQ - Ground Water

SW846 8081B SW846 3510C

Project:

BMSMC, Humacao, PR

Date Sampled:

03/02/17 Date Received: 03/03/17

Q

Percent Solids: n/a

Surrogate Recoveries

File ID Run #1 TT381296.D

DF 1

Analyzed 03/11/17

Ву MV Prep Date 03/06/17

Prep Batch OP64048

Analytical Batch

GTT1925

Run #2

Initial Volume

Final Volume

Run #1 Run #2

CAS No.

1000 ml

5.0 ml

CAS No. Compound Result

ND

RL

MDL Units

0.010 0.0024 ug/l

60-57-1 Dieldrin

Run#1

Run#2

Limits

877-09-8 Tetrachloro-m-xylene

90% 86% 42-127% 27-127%

2051-24-3 Decachlorobiphenyl



ND = Not detected

MDL = Method Detection Limit

RL = Reporting Limit

E = Indicates value exceeds calibration range

J = Indicates an estimated value

B = Indicates analyte found in associated method blank

Job Number: FA41752

Account:

AMANYWP Anderson, Mulholland & Associates

Project:

BMSMC; Humacao, PR

| Sample FA41752-2MS FA41752-2MSD FA41752-2 | File ID 146061.D 146062.D 146057.D | DF 1 1 | Analyzed 03/07/17 03/07/17 03/07/17 | By WV WV | Prep Date n/a n/a n/a | Prep Batch n/a n/a n/a | Analytical Batch VI1286 VI1286 VI1286 |
|--|---|--------------|--|----------------|--------------------------------|---------------------------------|--|
|--|---|--------------|--|----------------|--------------------------------|---------------------------------|--|

The QC reported here applies to the following samples:

FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8, FA41752-9, FA41752-10

| CAS No. | Compound | FA41752-2 ug/l Q | Spike ug/l | MS ug/l | MS % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|---|--|--|--|---|--|---|---|--|--------------------------------------|--|
| 71-43-2 67-66-3 75-71-8 107-06-2 87-68-3 1634-04-4 75-85-4 75-01-4 | Benzene Chloroform Dichlorodifluoromethane 1,2-Dichloroethane Hexachlorobutadiene Methyl Tert Butyl Ether Tert-Amyl Alcohol Vinyl Chloride | ND ND ND ND ND ND ND ND | 25 25 25 25 25 25 25 25 25 25 25 | 28.7 24.8 25.0 25.0 24.4 22.5 219 25.3 | 115 99 100 100 98 90 88 101 | 25 25 25 25 25 25 25 25 25 250 25 | 28.9 25.3 23.9 24.6 24.3 23.1 224 24.3 | 116 101 96 98 97 92 90 | 1 2 4 2 0 3 2 4 | 81-122/14 80-124/15 42-167/19 75-125/14 75-142/19 72-117/14 65-124/23 69-159/18 |
| CAS No. | Surrogate Recoveries | MS | MSD | FA | 41752-2 | Limits | | | | |
| 1868-53-7 17060-07-0 2037-26-5 460-00-4 | Dibromofluoromethane 1,2-Dichloroethane-D4 Toluene-D8 4-Bromofluorobenzene | 104% 109% 97% 99% | 101% 106% 101% 101% | 98% 106 104 101 | % % | 83-1189 79-1259 85-1129 83-1189 | င် ပ် | | | |



Method: SW846 8260C

^{* =} Outside of Control Limits.

Account:

AMANYWP Anderson, Mulholland & Associates

Project:

BMSMC, Humacao, PR

| Sample OP64081-MS | File ID L0690374.D | DF 1 | Analyzed 03/09/17 | By NG | Prep Date 03/08/17 | Prep Batch OP64081 | Analytical Batch SL3965 |
|----------------------|-----------------------|---------|----------------------|----------|--------------------|-----------------------|----------------------------|
| OP64081-MSD | L0690375.D | 1 | 03/09/17 | NG | 03/08/17 | OP64081 | SL3965 |
| FA41752-2 | L0690373.D | 1 | 03/09/17 | NG | 03/08/17 | OP64081 | SL3965 |

The QC reported here applies to the following samples:

Method: SW846 8270D

FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8, FA41752-9, FA41752-10

| CAS No. | Compound | FA41752-2 ug/l Q | Spike ug/l | MS ug/l | MS % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|-----------------------|--|---------------------|---------------|--------------|----------|--------------------|--------------|----------|--------|------------------------|
| 100-52-7 117-81-7 | Benzaldehyde bis(2-Ethylhexyl)phthalate | ND ND | 96.2 96.2 | 73.1 89.6 | 76 93 | 96.2 96.2 | 74.6 95.1 | 78 99 | 2 6 | 36-129/29 61-117/23 |
| CAS No. | Surrogate Recoveries | MS | MSD | FA4 | 1752-2 | Limits | | | | |
| 4165-60-0 321-60-8 | Nitrobenzene-d5 2-Fluorobiphenyl | 87% 86% | 87% 85% | 75% 72% | | 42-1089 40-1069 | | | | |
| 1718-51-0 | Terphenyl-d14 | 79% | 83% | 66% | | 39-1219 | 6 | | | |



^{* =} Outside of Control Limits.

Job Number: FA41752

Account:

AMANYWP Anderson, Mulholland & Associates

Project:

BMSMC, Humacao, PR

| Sample OP64082-MS OP64082-MSD | File ID W097850.D W097851.D | DF 1 | Analyzed 03/08/17 03/08/17 | By FS FS | Prep Date 03/08/17 03/08/17 | Prep Batch OP64082 OP64082 | Analytical Batch SW4352 SW4352 |
|-------------------------------------|-----------------------------------|---------|----------------------------------|----------------|-----------------------------------|----------------------------------|--------------------------------------|
| FA41752-2 | W097849.D | 1 | 03/08/17 | FS | 03/08/17 | OP64082 | SW4352 |

The QC reported here applies to the following samples:

Method: SW846 8270D BY SIM

Page 1 of 1

FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8, FA41752-9, FA41752-10

| CAS No. | Compound | FA41752-2 ug/l Q | Spike ug/l | | MS % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|--------------------|------------------------------------|---------------------|---------------|------|----------|---------------|-------------|----------|----------|------------------------|
| 56-55-3 91-20-3 | Benzo(a) anthracene Naphthalene | ND ND | 9.62 19.2 | | 76 67 | 9.62 19.2 | 8.2 14.4 | 85 75 | 12 12 | 65-106/22 56-105/27 |
| CAS No. | Surrogate Recoveries | MS | MSD | FA41 | 752-2 | Limits | | | | |
| 4165-60-6 | 0 Nitrobenzene-d5 | 92% | 99% | 60% | a | 42-1089 | % | | | |
| 321-60-8 | 2-Fluorobiphenyl | 94% | 99% | 63% | a | 40-1069 | % | | | |
| 1718-51-0 | | 74% | 79% | 55% | a | 39-1219 | % | | | |

(a) Surrogate recoveries corrected for actual spike amount.



^{* =} Outside of Control Limits.

Job Number: FA41752

Account:

AMANYWP Anderson, Mulholland & Associates

Project:

BMSMC, Humacao, PR

| OP64082-MS U060359.D 100 03/09/17 NJ 03/08/17 OP64082 SU2648 OP64082-MSD U060360.D 100 03/09/17 NJ 03/08/17 OP64082 SU2648 FA41752-2 U060358.D 100 03/09/17 NJ 03/08/17 OP64082 SU2648 | | | | | - | | | |
|--|--|--|--|--|---|--|--|--|
|--|--|--|--|--|---|--|--|--|

The QC reported here applies to the following samples:

Method: SW846 8270D BY SIM

Page 1 of 1

FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8, FA41752-9, FA41752-10

| CAS No. | Compound | FA41752- ug/l (| _ | Spike ug/l | MS ug/l | MS % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|------------------------------------|--|-------------------------|---|-------------------------|-------------------|---------|-------------------------------|-------------|----------|-----|----------------|
| 123-91-1 | 1,4-Dioxane | 791 1 | В | 19.2 | 1230 | 2283* a | 19.2 | 1060 | 1399* | 15 | 15-69/31 |
| CAS No. | Surrogate Recoveries | MS | | MSD | FA4 | 1752-2 | Limits | | | | |
| 4165-60-0 321-60-8 1718-51-0 | Nitrobenzene-d5 2-Fluorobiphenyl Terphenyl-d14 | 0%* b 0%* b 0%* b | | 0%* b 0%* b 0%* b | 0%* 0%* 0%* | b | 42-108% 40-106% 39-121% | ó | | | |

(a) Outside control limits due to high level in sample relative to spike amount.

(b) Outside control limits due to dilution.





^{* =} Outside of Control Limits.

Job Number: FA41752

Account:

AMANYWP Anderson, Mulholland & Associates

Project:

BMSMC, Humacao, PR

|--|

The QC reported here applies to the following samples:

Method: MADEP VPH REV 1.1

FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8, FA41752-9, FA41752-10

| CAS No. | Compound | rA41752-2 ug/l Q | Spike ug/l | MS ug/l | MS % | Spike ug/l | ug/l | MSD % | RPD | Rec/RPD |
|----------------------|----------------------------|---------------------|---------------|------------|----------------|--------------------|------|----------|-----|-----------|
| | C9- C10 Aromatics (Unadj.) | ND | 240 | 86.1 | 36* | 240 | 86.0 | 36* | 0 | 70-130/50 |
| CAS No. | Surrogate Recoveries | MS | MSD | FA | 11752-2 | Limits | | | | |
| 460-00-4 460-00-4 | BFB BFB | 96% 95% | 96% 94% | 109 106 | | 70-1309 70-1309 | _ | | | |



^{* =} Outside of Control Limits.

Job Number: FA41752

2-Fluorobiphenyl

321-60-8

Account: AMANYWP Anderson, Mulholland & Associates

BMSMC, Humacao, PR Project:

| Sample OP64057-MS OP64057-MSD FA41752-2 | File ID NN017759.D NN017760.D NN017756.D | DF 1 1 | Analyzed 03/10/17 03/10/17 03/10/17 | By MG MG MG | Prep Date 03/06/17 03/06/17 03/06/17 | Prep Batch OP64057 OP64057 OP64057 | Analytical Batch GNN896 GNN896 GNN896 |
|--|---|--------------|-------------------------------------|----------------------|---|---|--|
| | | | | | | | |

The QC reported here applies to the following samples:

119%

Method: MADEP EPH REV 1.1

Page 1 of 1

FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8, FA41752-9, FA41752-10

| CAS No. | Compound | FA41752-2 ug/l Q | Spike ug/l | MS MS ug/l % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|----------------------------------|---|---------------------|--------------------|-------------------|-------------------------------|-------------|----------|-----|-------------------|
| | C11-C22 Aromatics (Unadj.) | ND | 3400 | 3230 95 | 3400 | 2790 | 82 | 15 | 40-140/50 |
| CAS No. | Surrogate Recoveries | MS | MSD | FA41752-2 | Limits | | | | |
| 3386-33-2 580-13-2 84-15-1 | 1-Chlorooctadecane 2-Bromonaphthalene o-Terphenyl | 75% 120% 98% | 72% 104% 87% | 53% 95% 79% | 40-140% 40-140% 40-140% | 6 | | | |

96%

100%





^{* =} Outside of Control Limits.

Project:

Page 1 of 1

Method: SW846 8081B

fael Infante Méndez

Matrix Spike/Matrix Spike Duplicate Summary

Job Number: FA41752

AMANYWP Anderson, Mulholland & Associates Account:

BMSMC, Humacao, PR

The QC reported here applies to the following samples:

FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8, FA41752-9, FA41752-10

| CAS No. | Compound | FA41752-2 ug/l Q | Spike ug/l | MS ug/l | MS % | Spike ug/l | MSD ug/l | MSD % | RPD | Limits Rec/RPD |
|-----------------------|--|---------------------|---------------|------------|---------|--------------------|-------------|----------|-----|-------------------|
| 60-57-1 | Dieldrin | ND | 0.5 | 0.50 | 100 | 0.5 | 0.55 | 110 | 10 | 66-138/22 |
| CAS No. | Surrogate Recoveries | MS | MSD | FA4 | 41752-2 | Limits | | | | |
| 877-09-8 2051-24-3 | Tetrachloro-m-xylene Decachlorobiphenyl | 84% 102% | 90% 106% | 86% 92% | | 42-127% 27-127% | | | | |





| FA | 41 | 75 | 2 |
|----|----|----|---|
| | | | _ |

| | | FL | 1 | | 155 - 401-412-4101 LVT - 401-412-4101. | | | | | | | | | | | 778 | 55785 | 8463 | | <u>. </u> | constant Add 9 | | | | | |
|-----|---|--|-----------------|------------------|--|---------------|---------------------|--------------------------|-----------|-----------|------------|-------------|------------------------|------------|------------|----------|----------------|---------------|-------------|--|----------------|------------|-----|------------------|------------------------------------|----|
| - 1 | | Client / Reporting Information | A1. | Proped leave: | 11,000 | Protect | Protect Information | | | | | | | | | | d Anni | rale (e | e II | r cor | NI phy | poti | | 71. | Matrix Codes | |
| | | al princes | | | | | | | | | | | | | ař | 1 | 1 | | | | | 1 | H | li | DN - Drong Year | |
| | Arretor bross A | gen Multipliand & Assections Weren | | 187 0 2017 0 | rhandneter fla | apling - Offs | to Wolle | | | | | | | - | lä | | 1 | 1 | | l | | | H | IJ | OW - Ormen's Webser WW - Webser | |
| | 1700 1 | Nestchister Avenue, Bully 417 | | | | - Em | Berring S | | (1) | and grown | Report I | el . | | | ļ, | | ı | 1 | | | | | H | 1 1 | STV - Section Vision SD - Bull | |
| | Chy Sain Zu Chy Perchana NY 10577 Humana | | | | | | - | ALC: N | | | | | | | Ę | | ı | П | | | | ŀ | H | 1 1 | Mr Matje SED-Bedmark | |
| - | | Committee of the Commit | 0-0 | Project 9 | | PR | Street A. | - | | | | _ | | - | 8 | | i | | | l_ | | | H | | FID - Comm (148's) | |
| - | 7or | Trylor Taylor | Feat 8 | Charl Pershali C | | | CS- | | | | _ | | Zin | _ | 11DCA | | l _B | 1 | CHLTJ | Q. | | | H | | ARI - Alt SCIL - Chay Sale | |
| | | -281-0400 | | Came Parameter C | 4 | | | | | | | | 20 | - 1 | 15 | | 1 PER | 1 | | | | | H | ΙI | | |
| Ì | - | (A) Passan(A) | Propert Minings | | | - | - | | | | | | \neg | TA. | 13 | 12 | 8 | MANNE (CS-C18 | MBH (CIT CE | ı | | | | Openium Dane 10- | | |
| | | | | Terry Taylor | | Colombia | | | _ | | ، صحاد | | | | | | I I | 3 | ž. | 1 = | I | | | | Trip Bland | |
| | | | | | | | ***** | 1 | | 1. | l. lz | 1.1 | | П | 13 | 1 8 | Į. | E | § | 1 8 | 1 | 1 | l I | | | |
| | = | Field ID / Paint of Collection | | MEHR W/ | b | 7- | by | Meta. | | - 9 18 | | | | | | 3 # | 18 | 8 | 3 | 1 | 1 | <u>L.</u> | | | FYR R25 CHFA | |
| | | EB030117 | | | 3/1/17 | 8.30 | HR | AGEB | 12 | 10 | | <u> [4]</u> | Π | \Box | | (X | X | Х | Х | X | X | | | | | |
| | <u> </u> | | | | 3/1/17 | 14:18 | R4 | AO | 12 | 111 | Ц | 1 | Ш | 113 | | (X | X | X | X | X | X | | | | | |
| | <u> </u> | OSMW-18 MS | | | 7nnt | 14:34 | RI | AO | 12 | 101 | | 11 | 11 | 112 | () | X | X | X | Х | X | X | | Ш | | | |
| | 2 | | | | 3/1/17 | 14:54 | RB | AQ. | 12 | 101 | Ц | 4 | 11 | 1 3 | () | X | X | X | X | X | X | <u> </u> | | | | |
| νI | _3 | | | | 2/1/17 | 12:54 | RIS | AOFB | 12 | 10 | Щ | 14 | 44 | | () | <u> </u> | X | X | X | X | X | <u> </u> | | Ш | | |
| * | 4 | , DSMW-1D | | | \$/1/17 | 17:30 | R8 | AQ | 13 | 10 | 11 | 14 | 11 | 11) | () | X X | X | X | Х | X | X | Ļ | | Ш | | |
| .] | 4 | 78038117 | | | 3/1/17 | NA. | R8 | AO/TB | 3 | 13 | Ц. | 4 | 44 | 112 | ~ ~ | <u> </u> | ╄ | Ļ | | | | ļ | | | | |
| ا د | -42 | E9830217 OSMW-38 | | | 3/2/17 | 9:10 | PH | ACHER | 12 | 10 | # | 4 | # | 2 | | X | X | X | X | Х | X | ┞ | | | | |
| | -1 | | | | 3/2/17 | 11:32 | NR | AQ. | 12 | 101 | 113 | 4 | ++- | 1 | _ | L X | ĮX. | X | X | Х | X | ₩ | Н | Ш | | |
| 7 | <u>¥</u> - | OEMMAD | | | 3/2/17 | 13:15 | 167 | AO | 12 | 10 | 112 | 14 | # | 113 | () | X | X | X | X | X | X | - | | Ы | | |
| - 1 | _ | | - | | <u> </u> | - | - | - | - | ++ | 11 | ₩ | ++ | Н | | | ╌ | | _ | - | H | ┡ | Н | \vdash | | |
| - } | | Turkomani Yero (Basings days) | | | | | + | <u> </u> | Owto | Option: | No. sodo | Щ | | 1 | _ | | 1 | 100 | COM | | | #1.1049046 | - | | | |
| Ī | | II Date to Description | | سنازجا انججيب | - Pilip / Day- | | | - | of "A" (L | red I) | | Ò | MAD C | | | Т | | | | | | | | | | |
| - | | The state of the second | | | | | | PULLTI (* | | | | | HTABP Č. Stata Para | | | \vdash | | | | | _ | | | | | |
| - | | C Street Allert | | | | | | III Producti Carriera | | • | | | 000 Ave | _ | | | | | | | | | | | | |
| - | | 1 they designed to the state of | | | _ | | 10 | يسسين | | m "K" + 1 | | | Other | | | | | | | | | | | | | |
| - 1 | - | 1 Day CHECKERNEY Opining & Rock TVA date evolution VA Lagren | | | | | | | Comme | 4 T + | مست | OC Se | | | | | | | | | $\overline{}$ | | | | | _ |
| | - 3 | All and the second second | | | Sample Course | Marri by dogs | - | haline par | | | | | ery - Parti | | | May 1 | | | | | 1 | | | | 140 | ン |
| - | ٠, | 711/ | 3/2/12 | :1651 | d | - | -x | | | | le Park By | | 1 | X | | | -7 | - | | | 1 | 1 | - | _/) | 362/7 | ž. |
| ı | - | X | 4 | 1 | | | 7.3 | | | | beford Dys | | | , - | | | | - | - | | - 3/ | | - | | 124 | |
| ŀ | - | | The Pinns | | 3 | | - | _ | | 1000 | | 2. 44 | 1, 460, | | | - | | | | 4 | _ | fin t- | | Sept. 1 | - | |
| Į | 6 | | | | 1 | | | | | 452 | 184, 46 | 498 | 480 | ā <u> </u> | - | | | | | _ | | 0 | | | | |
| | | | | | | | | | | | | 11 | 1. | 11/ | ٦ <i>/</i> | 17 | 1 2 | 9 | 2 | 83.73 | 3 7 | | | | | |

FA41752: Chain of Custody Page 1 of 4

-

FA41752

| | | CCLITERT: | | CHAIN OF CUSTODY | | | | | | | | | | | PAGE 2 OF 2 | | | | | | | | | | | | | | | | |
|-----|-------------------------------|---|--|--|--|-----------|-------------------|----------|-------------|--|-------|-----------|---------------------------------|----|--|-----------------|-------------------------|----------------|-----------|---------------------------|--------------------|----------|----------|----------|-----------------------------------|--|------|--|--|---|--|
| | | FL | | 4403 Vineland Roud, Seas C-13, Orlands, Florida 32811 TE2, 407-425-6700 PAJC, 407-425-0707 | | | | | | | | | | | 700-C1 Translag 4 77 8557858463 Retro Close Control 6 Ameliana Jan 4 | | | | | | | | | | | | | | | | |
| [| Clant / Reporting Information | | | | | Project | ajust imprimation | | | | | | | | | | esteri | Analys | ola (a | n T28 | 7 000 | Labo | S | | | Matrix Codes | | | | | |
| | languary Madara | Hame are Multipliand & Associates dese | | * | regact Hanton ST Q 2017 Grean represent Bernsprings - Officially Wholis | | | | | | | | | | | | | | | | | | | | | DW - Drowing Water DW - Graund Water WW - Water | | | | | |
| - 1 | | estchaster Avenue, Suite 417 | 20 | Direct Chy | | | | | 7.00 | | , , | tei_ | | | | FILM, DODFILM, | | | - | | | | | | | | | | | Stri - Surface Wester SC - Self SL - Shelps | |
| ŀ | urche Inpel | NY | Humação Pajos II | | PR | | | | | | | | | | LOK | | | Mg/m | | _ | | | | | DI-CB (II-CburLipal) Adi-42 | | | | | | |
| - | Torry Torder Plant 8 Port 8 | | | Chart Purchase Co | Perhane Cotor # | | | | | - E | de . | | Zb | | | TAA, 12DCA, CH. | | 8 | 1 | CIB ONLY) | 75 OMT | , | - 1 | | , | SOL CON SAME NO VALUE CO-CAME DATE DO | | | | | |
| | | 291-4409)) *mmale) | Promis 6 | Proposi Marragor Terror Tendor | | | | | | | | | | | 븄 | TIE, TA | 3 | HEAVITHE, 14DI | 14 | 8 1 | MAZPHICISCOZ ONLY) | NE PORTO | | | | Opportunit (Marie 118- Obsess Share 118- Trip (Marie | | | | | |
| ۲۶. | | Field IO / Point of Collection | | MED-101 Value | | Catharin- | <u>.</u> | | e al lucius | , š | 10 | ľ | | | VEDROE | Very Art | 862788 | 70-7500 | bat Table | WANTH | - | Tees Co | | | | LAB USE DILT | | | | | |
| 8 | H | FB030217 | | | 3/2/17 | 11:10 | HR | AQFE | 12 | 9 | Ħ | 2 4 | | | х | X | $\overline{\mathbf{x}}$ | X | х | х | x | X. | | | | | | | | | |
| ă [| 10 | OSMW-25 | | | 3/2/17 | 11:36 | НЯ | AGF8 | 13 | 8 | | 2 4 | | | X | X | Х | X | Х | X | Х | X | | | | | | | | | |
| 10 | 11 | OSWW-2D | | | 3/2/17 | 13:57 | HR | AGFB | 12 | 8 | П | 2 4 | | | Х | Х | X | X | X | X | Х | X | | | <u> </u> | | | | | | |
| | | 7B030217 | | | 3/2/17 | MA | MA | AQ/TB | 3 | 3 | П | Ш | | Щ | Х | X | | | | | | | Ь. | L. | | | | | | | |
| L | | | | | | | | | | Ц. | Ц | 44 | - | | Ш | | | \vdash | _ | | _ | | | _ | | | | | | | |
| - | | | | | | | _ | | | <u></u> | Н | 44 | + | | | | | <u> </u> | _ | <u> </u> | ⊢ | | _ | | ┡ | | | | | | |
| L | | | | | | | | | | Щ | Ц | Ш | 4 | 4 | Ш | Ш | _ | \vdash | | _ | | | | <u> </u> | ├- | \vdash | | | | | |
| L | | | | | | <u> </u> | $ldsymbol{f eta}$ | <u></u> | | Ш | Ш | Щ | 4 | Ц. | \square | | _ | <u> </u> | | $ldsymbol{ldsymbol{eta}}$ | ᆜ | | <u> </u> | L | <u> </u> | | | | | | |
| L | | | | | | | | | | Щ | Ц | Ш | | 4 | | | | _ | _ | | _ | | _ | _ | ╄ | | | | | | |
| L | | | | | | | | <u> </u> | | Ш | Ш | Ш | \perp | | Ш | | _ | | | | | | | _ | <u> </u> | | | | | | |
| | | | | | | | | | | ш | Ш | Ш | \perp | Ш | | | | $oxed{oxed}$ | Ш. | | | | | _ | <u> </u> | | | | | | |
| | | | | 11,11 | | | | | | | П | | | | | | | | | | <u> </u> | | | | <u> </u> | | | | | | |
| | | Typenequed Yime (Byunnes (Hye) 3 Inc. 16 Humbers Days 3 Inc. 16 Humbers Days (by Contrast enty) 10 Day retific 8 Day settle 3 Day SMERMINGTY 2 Day SMERMINGTY | Communication Communicatii Communication Communication Communication Communication | | | | | | | - | | | Community (Spage) Indiquations | | | | | | | | | | | | | | | | | | |
|] | - i | L Day AMERICANCY Comp. (Page 7th con products 4th Labor | | Communication of the Communica | of a fee | nds + S | C Dec | - | | | | 11/1/1400 | | | | | | | | | | 0 | | | | | | | | | |
| | . 1 | 3/2/12:1651 | | | | | | | | | ***** | * | | X | | | | T | | | d | ME | | | | 3/03/17 | | | | | |
| Ĺ | | 1/ | | | 3 | | | | | 4 | | • | | | | | | Date To | | | 4/ | 7 | | | | | | | | | |
| ſ | Parkets 1 | ade to | Description of the last | 10 | Secretaria de la composição de la compos | | | | | Controls Seat 462, 464, 466, U Impat A 402, 454, 406, 466, 460 U Impatement | | | | | | | P | 7 | - | | | | 0 | | | 3.7.38 | م ال | | | | |

FA41752: Chain of Custody Page 2 of 4

EXECUTIVE NARRATIVE

SDG No:

FA41752

Laboratory:

Accutest, Orlando

Analysis:

SW846-8270D

Number of Samples:

12 Scan/24 SIM

Location:

BMSMC, Humacao, PR

SUMMARY: Twelve (12) samples were analyzed for Benzaldehyde and bis(2-Ethylhexyl)phthalate following method SW846-8270D. Twenty-four (24) samples were analyzed for selected PAHs and 1,4-Dioxane by SW846-8270D using the selective ion monitoring (SIM) technique; samples were analyzed separately for each analyte group. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: EPA Hazardous Waste Support Section, SOP HW-35A, July 2015 –Revision O. Semivolatile Data Validation. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues:

None

Major:

None

Minor:

None

Critical findings:

None

Major findings:

None

Minor findings:

1. All samples extracted and analyzed within method recommended holding time except for the cases described in the Data Review Worksheet.

Samples FA41752-1; FA41752-3; FA41752-5; and FA41752-8 re-extracted beyond holding time; re-extract results reported due to suspected laboratory contamination in original extract. Results qualified as estimated (J) in affected sample. Sample preservation was appropriate.

2. No target analytes detected in method blanks except in the cases described in the Data Review Worksheet.

Affected samples: FA41752-2, FA41752-4, FA41752-6, FA41752-7, FA41752-9, and FA41752-10. Samples qualified B by the laboratory. No further qualification performed based on method blank.

3. DMCs meet the required criteria in all samples analyzed except for the cases described in the Data Review Worksheet. Non-deuterated surrogates added to the samples and were within laboratory recovery limits except in the cases described in the Data Review Worksheet:

Surrogate standards not recovered in samples FA41752-2 and FA41752-4 due to dilution. No action taken, professional judgment.

COMMENTS:

Results are valid and can be used for decision making purposes.

Reviewers Name:

Rafael Infante

Chemist License 1888

Signature:

Date:

April 17, 2017

ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA41752-1

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Equipment Blank

METHOD: 8270D

| 0.5 |
|------|
| ng/L |
| ng/L |

METHOD: 8270D SIM

| Analyte Name | Result | Units Diluti | Dilution Factor | Lab Flag | Validation | Reportable | |
|--------------------|--------|--------------|-----------------|----------|------------|------------|--|
| Benzo(a)anthracene | 0.19 | | 1.0 | • | 5 | Yes | |
| 1,4-Dioxane | 0.32 | ng/L | 1.0 | | n n | Yes | |
| Naphthalene | 0.95 | | 1.0 | • | 3 | Yes | |

Sample ID: FA41752-2

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: 8270D

| a | | | | a | | | |
|-----------------|------------------|----------------------------|-----------------------|--|--------------------|-------------|-------------|
| Reportabl | Yes | Yes | | Reportabl | Yes | Yes | Yes |
| Validation | כ | כ | | Validation | _ | > | n |
| Lab Flag | • | ٠ | | Lab Flag | 1 | 8 | 1 |
| Vilution Factor | ug/L 1.0 - U Yes | 1.0 | | Units Dilution Factor Lab Flag Validation Reportable | 1.0 | 4.0 | 1.0 |
| | ng/L | ng/L | | Units D | ng/L | ng/L | ng/L |
| Result | 24 | 4.8 | METHOD: 8270D SIM | Result | 0.19 | 791 | 96'0 |
| Analyte Name | Benzaldehyde | bis(2-Ethylhexyl)phthalate | METH | Analyte Name | Benzo(a)anthracene | 1,4-Dioxane | Naphthaiene |

Sample ID: FA41752-3

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Field Blank Water

METHOD: 8270D

| Analyte Name | Result | Units Dil | Units Dilution Factor Lab Flag Validation | Lab Flag | Validation | Reportable |
|----------------------------|--------|-----------|---|----------|------------|------------|
| Benzaldehyde | 24 | ng/L | 1.0 | 1 | ⊃ | Yes |
| bis(2-Ethylhexyl)phthalate | 4.8 | ng/L | 1.0 | 1 | ⊃ | Yes |

METHOD: 8270D SIM

| Analyte Name | Result | Units Dilution Factor 1 | on Factor | ab Flag | Validation | Reportable |
|--------------------|--------|-------------------------|-----------|---------|------------|------------|
| Benzo(a)anthracene | 0.19 | ng/L | 1.0 | • | 5 | Yes |
| 1,4-Dioxane | 0.32 | ng/L | 1.0 | ı | n n | Ves Yes |
| Naphthalene | 96'0 | | 1.0 | • |) [U] | Yes |

Sample ID: FA41752-4

Sample location: BMSMC, Humacao, PR Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: 8270D

| Analyte Name | Result | Units Di | Units Dilution Factor Lab Flag Validation Reportable | Lab Flag | Validation | Reportable | |
|----------------------------|-------------------|----------|--|----------|------------|------------|--|
| Benzaldehyde | 24 | ng/L | 1.0 | , | ⊃ | Yes | |
| bis(2-Ethylhexyl)phthalate | 4.8 | ng/L | 1.0 | • | D | Yes | |
| METHOD: | METHOD: 8270D SIM | | | | | | |

| Analyte Name | Result | Units Di | Result Units Dilution Factor Lab Flag Validation Reportable | Lab Flag | Validation | Reportable |
|--------------------|--------|----------|---|----------|------------|------------|
| Benzo(a)anthracene | 0.19 | ng/L | 1.0 | • | ⊃ | Yes |
| 1,4-Dioxane | 795 | ng/L | 10.0 | 8 | > | Yes |
| Naphthalene | 0.95 | ng/L | 1.0 | 1 | ⊃ | Yes |

Sample ID: FA41752-5

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017
Matrix: AQ - Equipment Blank

METHOD: 8270D

| Reportable | Yes | Yes |
|----------------------------------|--------------|----------------------------|
| Validation | ⊃ | ב |
| Lab Flag | | • |
| Units Dilution Factor Lab Flag \ | 1.0 | 1.0 |
| Units | ng/L | ng/L |
| Result | 24 | 4.8 |
| Analyte Name | Benzaldehyde | bis(2-Ethylhexyl)phthalate |

METHOD: 8270D SIM

| Analyte Name | Result | Units Dil | Units Dilution Factor | Lab Flag | Validation | Reportable |
|-------------------|--------|-----------|-----------------------|----------|------------|------------|
| enzo(a)anthracene | 0.19 | ng/L | 1.0 | | | Yes |
| ,4-Dioxane | 0.32 | ng/L | 1.0 | | n | Yes |
| laphthalene | 96.0 | ng/L | 1.0 | t | | Yes |

Sample ID: FA41752-6

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8270D

| Analyte Name | | Units Dilu | tion Factor | Lab Flag | Validation | Reportable | |
|----------------------------|----|------------|-------------|----------|------------|------------------|--|
| Benzaldehyde | 24 | ng/L | 1.0 | • | ⊃ | ug/L 1.0 - U Yes | |
| bis(2-Ethylhexyl)phthalate | | ng/L | 1.0 | • | D | Yes | |
| | | | | | | | |

METHOD: 8270D SIM

| Reportable | Yes | Yes | Yes |
|--|--------------------|-------------|-------------|
| Validation |)) | ` | n |
| Lab Flag | ı | 8 | ì |
| Units Dilution Factor Lab Flag Validation Reportable | 1.0 | 2.0 | 1.0 |
| Units D | ng/L | ng/L | ng/L |
| | 0.19 | 2.4 | 0.95 |
| Analyte Name | Benzo(a)anthracene | 1,4-Dioxane | Naphthalene |

Sample ID: FA41752-7

Sample location: BMSMC, Humacao, PR Sampling date: 3/2/2017 Matrix: Groundwater

METHOD: 8270D

| Analyte Name | Result | Units Diluti | ion Factor | Lab Flag | Validation | Units Dilution Factor Lab Flag Validation Reportable | |
|----------------------------|--------|--------------|------------|----------|------------|--|--|
| Benzaldehyde | 24 | ng/L | 1.0 | , | _ | Yes | |
| bis(2-Ethylhexyl)phthalate | 4.8 | ng/L | 1.0 | ı | ⊃ | Yes | |

METHOD: 8270D SIM

| Analyte Name | Result | Units Dilution Factor Lab Flag Validation Reportable | on Factor | Lab Flag | Validation | Reportable | |
|--------------------|--------|--|-----------|----------|------------|------------|--|
| Benzo(a)anthracene | 0.19 | ng/L | 1.0 | • |)) | Yes | |
| 1,4-Dioxane | 5.6 | ng/L | 1.0 | В | - | Yes | |
| Naphthalene | 96.0 | ng/L | 1.0 | • |) | Yes | |

Sample ID: FA41752-8

Sample location: BMSMC, Humacao, PR Sampling date: 3/2/2017 Matrix: AQ - Flield Blank Water

METHOD: 8270D

| Analyte Name | Result | Units Dilut | Units Dilution Factor | or Lab Flag V | Validation | Reportable | |
|----------------------------|--------|-------------|------------------------------|---------------|------------|------------|--|
| Benzaldehyde | 24 | ng/L | 1.0 | • |) | Yes | |
| bis(2-Ethylhexyl)phthalate | 4.8 | ng/L | 1.0 | , | D | Yes | |

METHOD: 8270D SIM

| Reportable | Yes | Yes | Yes |
|--|--------------------|-------------|-------------|
| Validation | 5 | in in | ī |
| Lab Flag | 1 | • | • |
| Units Dilution Factor Lab Flag Validation Reportable | 1.0 | 1.0 | 1.0 |
| Units D | ng/L | ng/L | ug/t |
| Result | 0.19 | 0.30 | 0.95 |
| Analyte Name | Benzo(a)anthracene | 1,4-Dioxane | Naphthalene |

Sample ID: FA41752-9

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8270D

| Analyte Name | Result | Units Dil | Result Units Dilution Factor Lab Flag Validation Reportable | Lab Flag | Validation | Reportable | |
|----------------------------|-----------|-----------|---|----------|------------|------------|--|
| Benzaldehyde | 25 | ng/L | 1.0 | E | ⊃ | Yes | |
| bis(2-Ethylhexyl)phthalate | 4.9 | ng/L | 1.0 | 9 | ⊃ | Yes | |
| MAETLON. GOLDA | אויי מסדר | P4 | | | | | |

METHOD: 8270D SIM

| Analyte Name | Result U | Units Dilution Factor Lab Flag Validation Reportable | on Factor | Lab Flag | Validation | Reportable | |
|--------------------|----------|--|-----------|----------|------------|------------|--|
| Benzo(a)anthracene | 0.20 | ng/L | 1.0 | • | n | Yes | |
| 1,4-Dioxane | 28.0 | ng/L | 2.0 | В | - | Yes | |
| Naphthalene | 0.98 | ng/L | 1.0 | • | D | Yes | |

Sample ID: FA41752-10

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8270D

| Analyte Name | Result | Units Di | Units Dilution Factor Lab Flag Validation Reportable | Lab Flag | Validation | Reportable | |
|----------------------------|---------|----------|--|----------|------------|------------|--|
| Benzaldehyde | 24 | ng/L | 1.0 | • | ⊃ | Yes | |
| bis(2-Ethylhexyl)phthalate | 8.8 | ug/L | 1.0 | • | n | Yes | |
| | | | | | | | |
| METHOD: 8270D SIM | 70D SIM | | | | | | |
| Analyte Name | Result | Units Di | Jnits Dilution Factor Lab Flag Validation Reportable | Lab Flag | Validation | Reportable | |
| Benzo(a)anthracene | 0.19 | ng/L | 1.0 | • | | Yes | |
| 1,4-Dioxane | 24.6 | ug/L | 2.0 | 8 | > | Yes | |
| Naphthalene | 0.95 | ng/L | 1.0 | 1 | ⊃ | Yes | |

Sample ID: FA41752-2MS
Sample location: BMSMC, Humacao, PR
Sampling date: 3/1/2017
Matrix: Groundwater

METHOD: 8270D

| able | | |
|-----------------------|--------------|----------------------------|
| Report | Yes | Yes |
| Validation Reportable | , | 1 |
| Lab Flag | 1 | ı |
| Units Dilution Factor | 1.0 | 1.0 |
| Units | ng/L | ng/L |
| Result | 73.1 | 9.68 |
| Analyte Name | Benzaldehyde | bis(2-Ethylhexyl)phthalate |

METHOD: 8270D SIM

| Analyte Name | Result | Units Dilu | Units Dilution Factor Lab Flag \ | Lab Flag | Validation | Validation Reportable | |
|--------------------|--------|------------|----------------------------------|----------|------------|-----------------------|--|
| Benzo(a)anthracene | 7.3 | ug/L | 1.0 | • | • | Yes | |
| Naphthalene | 12.3 | ng/L | 1.0 | • | • | Yes | |

METHOD: 8270D SIM

| Analyte Name | Result | Units Dil | Juits Dilution Factor | Lab Flag | Validation | Reportable | |
|--------------|--------|-----------|-----------------------|----------|------------|------------|--|
| 1,4-Dioxane | 1230 | ng/L | 1.0 | • | • | Yes | |

Sample ID: FA41752-2MSD
Sample location: BMSMC, Humacao, PR
Sampling date: 3/1/2017
Matrix: Groundwater

METHOD: 8270D

| n Reportable | Yes | Yes |
|--------------------------------|--------------|----------------------------|
| Validatio | • | ı |
| Lab Flag | • | • |
| Units Dilution Factor Lab Flag | 1.0 | 1.0 |
| Units | ng/L | ng/L |
| Result | 74.6 | 95.1 |
| Analyte Name | Benzaldehyde | bis(2-Ethylhexyl)phthalate |

METHOD: 8270D SIM

| Anaiyte Name | Result | Units Dilu | Units Dilution Factor | Lab Flag | Validation Re | Reportable |
|--------------------|--------|------------|-----------------------|----------|---------------|------------|
| Benzo(a)anthracene | 8.2 | ng/L | 1.0 | 1 | | Yes |
| Naphthalene | 14.4 | ng/L | 1.0 | à | ū | Yes |

METHOD: 8270D SIM

| Reportable | Yes |
|-----------------------|-------------|
| Validation | |
| Lab Flag | • |
| Units Dilution Factor | 1.0 |
| Units [| ng/L |
| Result | 1060 |
| Analyte Name | 1,4-Dioxane |

ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA41811-1

Sample location: BMSMC, Humacao, PR

Sampling date: 3/3/2017 Matrix: AQ - Equipment Blank

METHOD: 8270D

| Analyte Name | Result | Units Diluti | Units Dilution Factor Lab Flag | Lab Flag | Validation | Validation Reportable | |
|----------------------------|--------|--------------|--------------------------------|----------|------------|-----------------------|--|
| Benzaldehyde | 25 | ng/L | 1.0 | ŧ | n | Yes | |
| bis(2-Ethylhexyl)phthalate | 4.9 | ng/L | 1.0 | • | n | Yes | |
| | | | | | | | |

METHOD: 8270D SIM

| Analyte Name | Result | Units Dilu | Units Dilution Factor | Lab Flag | Validation | Lab Flag Validation Reportable |
|--------------------|--------|------------|-----------------------|----------|------------|--------------------------------|
| Benzo(a)anthracene | 0.20 | | | • | ⊃ | Yes |
| 1,4-Dioxane | 0.29 | ng/L | 1.0 | • | • | Yes |
| Naphthalene | 0.98 | | 1.0 | • | ⊃ | Yes |

Sample ID: FA41811-2

Sample location: BMSMC, Humacao, PR

Sampling date: 3/3/2017 Matrix: AQ - Water

METHOD: 8270D

| Analyte Name | Result | Units Dil | Result Units Dilution Factor Lab Flag Validation Reportable | Lab Flag | Validation | Reportable | |
|----------------------------|-------------------|-----------|---|----------|------------|------------|--|
| Benzaldehyde | 25 | ng/L | 1.0 | • | ⊃ | Yes | |
| bis(2-Ethylhexyl)phthalate | 4.9 | ng/L | 1.0 | • | n | Yes | |
| METHOD | METHOD: 8270D SIM | | | | | | |

| Analyte Name | Result | Units Dill | Result Units Dilution Factor Lab Flag Validation Reportable | Lab Flag | Validation | Reportable |
|-------------------|--------|------------|---|----------|------------|------------|
| enzo(a)anthracene | 0.20 | ng/L | 1.0 | ı | 0 | Yes |
| ,4-Dioxane | 21.5 | ng/L | 4.0 | ı | • | Yes |
| Naphthalene | 0.98 | ng/L | 1.0 | • | ⊃ | Yes |

| | Project Number:_FA41752 |
|---|---|
| REVIEW OF SEMIVOLATILE | ORGANIC PACKAGE |
| The following guidelines for evaluating volatile or validation actions. This document will assist the make more informed decision and in better serving results were assessed according to USEPA data following order of precedence: EPA Hazardous V2015—Revision 0. Semivolatile Data Validation. The Conthe data review worksheets are from the primated. | eviewer in using professional judgment to g the needs of the data users. The sample ta validation guidance documents in the Waste Support Section, SOP HW-35A, July C criteria and data validation actions listed |
| The hardcopied (laboratory name) _Accutesteviewed and the quality control and performance dancluded: | data package received has been ta summarized. The data review for SVOCs |
| Lab. Project/SDG No.:FA41752 | |
| X Data CompletenessX Holding TimesX GC/MS TuningX Internal Standard PerformanceX BlanksX Surrogate RecoveriesX Matrix Spike/Matrix Spike Duplicate | X Laboratory Control SpikesX Field DuplicatesX CalibrationsX Compound IdentificationsX Compound QuantitationX Quantitation Limits |
| Overall Comments:_Selected_SVOCs_from_the_TCL_s 8270D;_Selected_PAHs_and_1,4-Dioxane_analyzed_b and_PAH's_analyzed_separately | |
| Definition of Qualifiers: | |
| J- Estimated results J- Compound not detected R- Rejected data JJ- Estimated nondetect Reviewer: April 17, 2017 | |

DATA COMPLETENESS

| MISSING INFORMATION | DATE LAB. CONTACTED | DATE RECEIVED |
|---------------------|---------------------|---------------------|
| _ | | |
| | | |
| | | |
| | | |
| | * | |
| | | |
| VIV.1 = | | |
| | | |
| | | \$2 (V) (V) (V) (V) |
| | | |
| 200 | | 1 |
| | | 1 |
| | | |
| | | - |

| All criteria were met |
|-----------------------|
| Criteria were not met |
| and/or see belowX |

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

| SAMPLE ID | DATE | DATE | рН | ACTION |
|-------------------------------------|----------------------------------|--|-----------------|---|
| | SAMPLED | EXTRACTED/ANALYZED | | |
| | | | [| |
| | | | | |
| described in this beyond holding to | document. San ime; re-extract | nples FA41752-1; FA41752-3 results reported due to susp | 3; FA4 ected | d holding time except for the cases 1752-5; and FA41752-8 re-extracted laboratory contamination in original ple preservation appropriate. |
| | | | | |

| Coole | r temperature | (Criteria: 4 <u>+</u> 2 ∘(| ?):3 | .74.0_ºC | |
|-------|---------------|----------------------------|------|----------|--|
|-------|---------------|----------------------------|------|----------|--|

Actions

Results will be qualified based on the criteria of the following Table:

Table 1. Holding Time Actions for Semivolatile Analyses

| | 1 11010 | ing Time Actions for Semivi | | tion |
|-------------|-----------|--|-------------------------------|-----------------------------------|
| Matrix | Preserved | Criteria | Detected Associated Compounds | Non-Detected Associated Compounds |
| | No | ≤7 days (for extraction) ≤40 days (for analysis) | Use professi | onal judgment |
| | No | > 7 days (for extraction) > 40 days (for analysis) | J | Use professional judgment |
| Aqueous | Yes | ≤ 7 days (for extraction) ≤ 40 days (for analysis) | No qua | lification |
| | Yes | > 7 days (for extraction) > 40 days (for analysis) | J | ບມ |
| | Yes/No | Grossly Exceeded J | | UJ or R |
| | No | ≤ 14 days (for extraction) ≤ 40 days (for analysis) | Use profession | onal judgment |
| Non-Aqueous | No | > 14 days (for extraction) > 40 days (for analysis) | J | Use professional judgment |
| Non-Addeous | Yes | ≤ 14 days (for extraction) ≤ 40 days (for analysis) | No qua | lification |
| | Yes | > 14 days (for extraction) > 40 days (for analysis) | J | UJ |
| | Yes/No | Grossly Exceeded | J | UJ or R |

| All criteria were metX_ | |
|---------------------------------|--|
| Criteria were not met see below | |

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

- _X__ The DFTPP performance results were reviewed and found to be within the specified criteria.
- _X__ DFTPP tuning was performed for every 12 hours of sample analysis.

If no, use professional judgment to determine whether the associated data should be accepted, qualified or rejected.

Notes: These requirements do not apply when samples are analyzed by the Selected Ion Monitoring (SIM) technique.

All mass spectrometer conditions must be identical to those used during the sample analysis. Background subtraction actions resulting in spectral distortion are unacceptable

Notes: No data should be qualified based of DFTPP failure.

The requirement to analyze the instrument performance check solution is optional when analysis of PAHs/pentachlorophenol is to be performed by the SIM technique.

| List | the | samples | affected: |
|------|------|---------|-----------|
| | | | |
| | 1000 | | |

Actions:

- If sample are analyzed without a preceding valid instrument performance check or are analyzed 12 hours after the Instrument Performance Check, qualify all data in those samples as unusable (R).
- 2. If ion abundance criteria are not met, use professional judgment to determine to what extent the data may be utilized.
- State in the Data Review Narrative, decisions to use analytical data associated with DFTPP instrument performance checks not meeting the contract requirements.
- 4. Use professional judgment to determine if associated data should be qualified based on the spectrum of the mass calibration compounds.

| | | | C | all criteria were metX Criteria were not met Ind/or see below | | | | | |
|--|---|---|------------------------------|---|--|--|--|--|--|
| INITIAL C | INITIAL CALIBRATION VERIFICATION | | | | | | | | |
| Compliand instrumen | Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data. | | | | | | | | |
| Instrumen | t ID number | rs:GCMSL | AN) 02/13/ GCMS Aqueou | SW | | | | | |
| Instrumen | t ID numbe | ion:02/23/17_(SIM)_ rs:GCMSU Aqueous/low_ | | | | | | | |
| DATE | DATE LAB FILE CRITERIA OUT COMPOUND SAMPLES AFFECTED | | | | | | | | |
| Initial and initial calibration verification meets the method and guidance validation document performance criteria. | | | | | | | | | |
| | | | | | | | | | |

Note:

Actions:

Qualify the initial calibration analytes listed in Table 2 using the following criteria:

Table 3. Initial Calibration Actions for Semivolatile Analysis

| Criteria | | Action | |
|---|---|-----------------------------|--|
| Criteria | Detect | Non-detect | |
| Initial Calibration not performed at specified frequency and sequence | Use professional judgment | Use professional judgment R | |
| initial Calibration not performed at the specified concentrations | J | th | |
| RRF < Minimum RRF in Table 2 for target analyte | Use professional judgment J+ or R | R | |
| RRF ≥ Minimum RRF in Table 2 for target analyte | No qualification | No qualification | |
| %RSD > Maximum %RSD in Table 2 for target analyte | J | Use professional judgment | |
| %RSD ≤ Maximum %RSD in Table 2 for target analyte | No qualification | No qualification | |

Initial Calibration

Table 2. RRF, %RSD, and %D Acceptance Criteria in Initial Calibration and CCV for Semivolatily Analysis

| Analyte | Minimum RRF | Maximum %RSD | Opening Maximum %D ¹ | Opening Maximum %D ¹ |
|-------------------------------|----------------|-----------------|---------------------------------------|---------------------------------------|
| 1,4-Dioxane | 0.010 | 40.0 | ± 40.0 | ÷ 50.0 |
| Benzaldehyde | 0.100 | 40.0 | ±40.0 | ± 50.0 |
| Phenol | 0.080 | 20.0 | ±20.0 | ± 25.0 |
| Bis(2-chloroethyl)ether | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| 2-Chlorophenol | 0.200 | 20.0 | ± 20.0 | ± 25.0 |
| 2-Methylphenol | 0.010 | 20.0 | ±20.0 | ± 25.0 |
| 3-Methylphenol | 0.010 | 20.0 | ± 20.0 | ± 25.0 |
| 2,2'-Oxybis-(1-chloropropane) | 0.010 | 20.0 | ±25.0 | ± 50.0 |
| Acetophenone | 0.060 | 20.0 | ± 20.0 | = 25.0 |
| 4-Methylphenol | 0.010 | 20.0 | ± 20.0 | ±25.0 |
| N-Nitroso-di-n-propylamine | 0.080 | 20.0 | ± 25.0 | ±25.0 |
| Hexachloroethane | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| Nitrobenzene | 0.090 | 20.0 | ± 20.0 | ±25.0 |
| Isophorone | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| 2-Nitrophenol | 0.060 | 20.0 | ± 20.0 | ± 25.0 |
| 2,4-Dimethylphenol | 0.050 | 20.0 | ±25.0 | - 50.0 |
| Bis(2-chloroethoxy)methane | 0.080 | 20.0 | ± 20.0 | ±25.0 |
| 2,4-Dichlorophenol | 0.060 | 20.0 | ± 20.0 | ±25.0 |
| Naphthalene | 0.200 | 20.0 | ± 20.0 | ± 25.0 |
| 4-Chloroaniline | 0.010 | 40.0 | ± 40.0 | ± 50.0 |
| Hexachlorobutadiene | 0.040 | 20.0 | ± 20.0 | ± 25.0 |
| Caprolactam | 0.010 | 40.0 | ± 30.0 | ±50.0 |
| 4-Chloro-3-methylphenol | 0.040 | 20.0 | ± 20.0 | ±25.0 |
| 2-Methylnaphthalene | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| Hexachlorocyclopentadiene | 0.010 | 40.0 | ± 40.0 | ±50.0 |
| 2,4,6-Trichlorophenol | 0.090 | 20.0 | = 20.0 | ± 25.0 |
| 2,4,5-Trichlorophenol | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| 1,1'-Biphenyl | 0.200 | 20.0 | ± 20.0 | ± 25.0 |

| Analyte | Minimum RRF | Maximum %RSD | Opening Maximum %D ¹ | Opening Maximum %D ¹ |
|----------------------------|----------------|-----------------|---------------------------------------|---------------------------------------|
| 2-Chloronaphthalene | 0.300 | 20.0 | ± 20.0 | ± 25.0 |
| 2-Nitroaniline | 0.060 | 20.0 | ± 25.0 | ± 25.0 |
| Dimethylphthalate | 0.300 | 20.0 | ± 25.0 | ± 25.0 |
| 2,6-Dinitrotoluene | 0.080 | 20.0 | ± 20.0 | ± 25.0 |
| Acenaphthylene | 0.400 | 20.0 | ± 20.0 | ±25.0 |
| 3-Nitroaniline | 0.010 | 20.0 | ± 25.0 | ± 50.0 |
| Acenaphthene | 0.200 | 20.0 | ±20.0 | ± 25.0 |
| 2,4-Dinitrophenol | 0.010 | 40.0 | ± 50.0 | ± 50.0 |
| 4-Nitrophenol | 0.010 | 40.0 | ± 40.0 | ± 50.0 |
| Dibenzofuran | 0.300 | 20.0 | ± 20.0 | ±25.0 |
| 2,4-Dinitrotoluene | 0.070 | 20.0 | ±20.0 | ±25.0 |
| Diethylphthalate | 0.300 | 20.0 | ±20.0 | ± 25.0 |
| 1,2,4,5-Tetrachlorobenzene | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| 4-Chlorophenyl-phenylether | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| Fluorene | 0.200 | 20.0 | ± 20.0 | ± 25.0 |
| 4-Nitroaniline | 0.010 | 40.0 | ±40.0 | ± 50.0 |
| 4,6-Dinitro-2-methylphenol | 0.010 | 40.0 | ±30.0 | ± 50.0 |
| 4-Bromophenyl-phenyl ether | 0.070 | 20.0 | ±20.0 | ±25.0 |
| N-Nitrosodiphenylamine | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| Hexachlorobenzene | 0.050 | 20.0 | ±20.0 | ± 25.0 |
| Atrazine | 0.010 | 40.0 | ± 25.0 | ± 50.0 |
| Pentachlorophenol | 0.010 | 40.0 | ± 40.0 | ± 50.0 |
| Phenanthrene | 0.200 | 20.0 | ± 20.0 | ± 25.0 |
| Anthracene | 0.200 | 20.0 | ± 20.0 | ± 25.0 |
| Carbazole | 0.050 | 20.0 | ±20.0 | ± 25.0 |
| Di-n-butylphthalate | 0.500 | 20.0 | ±20.0 | ±25.0 |
| Fluoranthene | 0.100 | 20.0 | ± 20.0 | ± 25.0 |
| Pyrene | 0.400 | 20.0 | ± 25.0 | ± 50.0 |
| Butylbenzylphthalate | 0.100 | 20.0 | ± 25.0 | ±50.0 |

| Analyte | Minimum RRF | Maximum %RSD | Opening Maximum %D ^t | Opening Maximum %D ¹ |
|-----------------------------|----------------|-----------------|---------------------------------------|---------------------------------------|
| 3,3'-Dichlorobenzidine | 0.010 | 40.0 | ± 40.0 | ±50.0 |
| Benzo(a)anthracene | 0.300 | 20.0 | ± 20.0 | ± 25.0 |
| Chrysene | 0.200 | 20.0 | ±20.0 | ±50.0 |
| Bis(2-ethylhexyl) phthalate | 0.200 | 20.0 | ±25.0 | ± 50.0 |
| Di-n-octylphthalate | 0.010 | 40.0 | ± 40.0 | ± 50.0 |
| Benzo(b)fluoranthene | 0.010 | 20.0 | ± 25.0 | ± 50.0 |
| Benzo(k)fluoranthene | 0.010 | 20.0 | ± 25.0 | ± 50.0 |
| Benzo(a)pyrene | 0.010 | 20.0 | ±20.0 | ± 50.0 |
| Indeno(1,2,3-cd)pyrene | 0.010 | 20.0 | ±25.0 | ± 50.0 |
| Dibenzo(a,h)anthracene | 0.010 | 20.0 | ±25.0 | ±50.0 |
| Benzo(g,h,i)perylene | 0.010 | 20.0 | ±30.0 | ± 50.0 |
| 2,3,4,6-Fetrachlorophenol | 0.040 | 20.0 | ±20.0 | ± 50.0 |
| Naphthalene | 0.600 | 20.0 | ±25.0 | ±25.0 |
| 2-Methylnaphthalene | 0.300 | 20.0 | ± 20.0 | ± 25.0 |
| Acenaphthylene | 0.900 | 20.0 | ±20.0 | ± 25.0 |
| Acenaphthene | 0.500 | 20.0 | ± 20.0 | ± 25.0 |
| Fluorene | 0.700 | 20.0 | ±25.0 | ± 50.0 |
| Phenanthrene | 0.300 | 20.0 | ±25.0 | ± 50.0 |
| Anthracene | 0.400 | 20.0 | ± 25.0 | ± 50.0 |
| Fluoranthene | 0.400 | 20.0 | ± 25.0 | ± 50.0 |
| Pyrene | 0.500 | 20.0 | ±30.0 | ± 50.0 |
| Benzo(a)anthracene | 0.400 | 20.0 | ±25.0 | ± 50.0 |
| Chyrsene | 0.400 | 20.0 | ± 25.0 | ± 50.0 |
| Benzo(b)lluoranthene | 0.100 | 20.0 | ±30.0 | ± 50.0 |
| Benzo(k)fluoranthene | 0.100 | 20.0 | ± 30.0 | ±50.0 |
| Benzo(a)pyrene | 0.100 | 20.0 | ±25.0 | ± 50.0 |
| Indeno(1,2,3-cd)pyrene | 0.100 | 20.0 | ± 40.0 | ± 50.0 |
| Dibenzo(a,h)anthracene | 0.010 | 25.0 | ± 40.0 | ± 50.0 |
| Benzo(g,h,i)perylene | 0.020 | 25.0 | ± 40.0 | ± 50.0 |
| | | | _ | |

| Pentachlorophenol | 0.010 | 40.0 | ±50.0 | ± 50.0 |
|-------------------------------|-------|------|-------|--------|
| Deuterated Monitoring Compoun | nds | - | | |

| Analyte | Minimum RRF | Maximum %RSD | Opening Maximum %D ¹ | Closing Maximum %D |
|---|----------------|-----------------|---------------------------------------|--------------------------|
| 1,4-Dioxane-d ₈ | 0.010 | 20.0 | ±25.0 | ± 50.0 |
| Phenol-d _s | 0.010 | 20.0 | ±25.0 | ±25.0 |
| Bis-(2-chloroethyl)ether-d ₈ | 0.100 | 20.0 | ± 20.0 | ±25.0 |
| 2-Chlorophenol-d4 | 0.200 | 20.0 | ± 20.0 | ±25.0 |
| 4-Methylphenol-d ₈ | 0.010 | 20.0 | ± 20.0 | ± 25.0 |
| 4-Chloroaniline-d4 | 0.010 | 40.0 | ± 40.0 | ± 50.0 |
| Nitrobenzene-d ₃ | 0.050 | 20.0 | ± 20.0 | ± 25.0 |
| 2-Nitrophenol-d4 | 0.050 | 20.0 | ± 20.0 | ±25.0 |
| 2,4-Dichlorophenol-d3 | 0.060 | 20.0 | ± 20.0 | ±25.0 |
| Dimethylphthalate-d ₆ | 0.300 | 20.0 | ± 20.0 | ± 25.0 |
| Acenaphthylene-d ₈ | 0.400 | 20.0 | ± 20.0 | ±25.0 |
| 4-Nitrophenol-d ₄ | 0.010 | 40.0 | ±40.0 | ±50.0 |
| Fluorene-d ₁₀ | 0.100 | 20.0 | ±20.0 | ±25.0 |
| 4,6-Dinitro-2-methylphenol-d2 | 0.010 | 40.0 | ± 30.0 | ± 50.0 |
| Anthracene-d ₁₀ | 0.300 | 20.0 | ± 20.0 | ±25.0 |
| Pyrene-d _{III} | 0.300 | 20.0 | ± 25.0 | ± 50.0 |
| Benzo(a)pyrene-d ₁₂ | 0.010 | 20.0 | ± 20.0 | ± 50.0 |
| Fluoranthene-d ₁₀ (SIM) | 0.400 | 20.0 | ± 25.0 | ± 50.0 |
| 2-Methylnaphthalene-d ₁₀ (SIM) | 0.300 | 20.0 | ± 20.0 | ± 25.0 |

¹ If a closing CCV is acting as an opening CCV, all target analytes must meet the requirements for an opening CCV.

Note: If analysis by SIM technique is requested for PAH/pentachlorophenols, calibration standards analyzed at 0.10, 0.20, 0.40, 0.80, and 1.0 ng/uL for each target compound of interest and the associated DMCs. Pentachlorophenol will require only a four point initial calibration at 0.20, 0.40, 0.80, and 1.0 ng/uL.

| | | | | | Criteria were not met and/or see below | |
|------------|--------------|--------------------|----------------------------------|---|---|---|
| CONTIN | UING CA | LIBRAT | TON VERIFICATION/ | | | |
| | | | | rument calibration are ing acceptable quantita | established to ensure that th | e |
| Date of o | continuing | g calibra | tion verification (CCV): | _03/08/17;_03/17/17 | 02/23/17_(SIM) 02/23/17 03/09/17;_03/14/17 _03/20/17 | _ |
| Date of o | closing Co | CV:02 | 2/14/17;_03/08/17;_03/ | 18/17 | GCMSUAqueous/low | _ |
| Instrume | nt ID nun | nbers: | GC | MSW | GCMSU | _ |
| Matrix/Le | evel: | | Aque | ous/low | Aqueous/low | _ |
| Date of in | nitial calib | oration v | erification (ICV):02 | 7_(SCAN) | | |
| Instrume | nt ID nun | nbers: | GCMSL_ | | | |
| Matrix/Le | evel: | | Aque | ous/low | | |
| DATE | 1 | | CRITERIA OUT RFs, %RSD, %D, r | COMPOUND | SAMPLES AFFECTED | |
| 03/13/17 | | | | | | |
| | | | | | A == 1 | |
| | | THE REAL PROPERTY. | | | | |
| | P. Carrier | | | 4 | | |

Note: Initial and continuing calibration verifications meet the method and guidance document required performance criteria.

No closing calibration verification included in data package for instruments GCMSU (SIM) and GCMSL (SCAN). No action taken, professional judgment.

Actions:

Notes: Verify that the CCV is run at the required frequency (an opening and closing CCV must be run within 12-hour period).

All DMCs must meet the RRF values given in Table 2. No qualification of the data is necessary on DMCs RRF and %RSD/%D alone. Use professional judgment to evaluate DMCs and %RSD/%D data in conjunction with DMCs recoveries to determine the need for qualification of the data.

Qualify the initial calibration analytes listed in Table 2 using the following criteria in the CCVs:

Table 4. CCV Actions for Semivolatile Analysis

| Criteria for Opening CCV | Criteria for Closing CCV - | Ac | Action | | |
|---|---|---|--------------------------------------|--|--|
| Criteria for Opening CCV | Criteria for Closing CCV | Detect | Non-detect | | |
| CCV not performed at required frequency and sequence | CCV not performed at required frequency | Use professional judgment R | Use professional judgment R | | |
| CCV not performed at specified concentration | CCV not performed at specified concentration | Use professional judgment | Use professional judgment | | |
| RRF < Minimum RRF in Table 2 for target analyte | RRF < Minimum RRF in Table 2 for target analyte | Use professional judgment J or R | R | | |
| RRF ≥ Minimum RRF in Table 2 for target analyte | RRF ≥ Minimum RRF in Table 2 for target analyte | No qualification | No qualification | | |
| %D outside the Opening Maximum %D limits in Table 2 for target analyte | %D outside the Closing Maximum %D limits in Table 2 for target analyte | J | ÚJ | | |
| %D within the inclusive Opening Maximum %D limits in Table 2 for target analyte | %D within the inclusive Closing Maximum %D limits in Table 2 for target analyte | No qualification | No qualification | | |

Note:

| | | | | All criteria were met Criteria were not metX | | |
|---|-----------------------------|------------------|------------------------|--|--|--|
| BLANK ANALY | SIS RESULTS (| Sections 1 & 2 |) | | | |
| The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data. | | | | | | |
| List the contami | nation in the bla | nks below. Hig | h and low levels blan | ks must be treated separately. | | |
| Notes: | The concentratug/L. | ion of non-targ | et compounds in all t | planks must be less than or equal to 10 | | |
| | The concentrate the method. | ion of target co | ompounds in all blant | s must be less than its CRQL listed in | | |
| | Samples taken | from a drinking | y water tap do not hav | e and associated field blank. | | |
| Laboratory blan | ks | | | .* | | |
| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS | | |

DATE LAB ID LEVEL/ COMPOUND ANALYZED MATRIX _No_target_analytes_detected_in_method_blanks_except_for_the_cases_described_in_this______d ocument.___ ______ _03/09/17_____OP64082-MB__ _Aq./low___ _1,4-Dioxane_______0.47_ug/l____ Note: Affected samples: FA41752-2, FA41752-4, FA41752-6, FA41752-7, FA41752-9, and FA41752-10. Samples qualified B by the laboratory. Sample results above the below laboratory blank and reporting limits are retained. Sample results below the reporting limit are qualified as non-detected (U) at the reporting limit. Field/Equipment/Trip blank DATE LAB ID LEVEL/ COMPOUND CONCENTRATION **ANALYZED MATRIX UNITS** _No_target_analytes_detected_in_the_field/equipment_blanks_analyzed_with_this_data_package._____

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Qualify samples based on the criteria summarized in Table 5:

Table 5. Blank and TCLP/SPLP LEB Actions for Semivolatile Analysis

| Blank Type | Blank Result | Sample Result | Action |
|-------------------------|---|---------------------------|---|
| | Detect | Non-detect | No qualification |
| | < CRQL | < CRQL | Report at CRQL and qualify as non-detect (U) |
| <u> </u> | | ≥ CRQL | Use professional judgment |
| | | < CRQL | Report at CRQL and qualify as non-detect (U) |
| Method, | ≥ CRQI, | ≥ CRQL but < Blank Result | Report at sample results and qualify as non-detect (U) or as unusable (R) |
| TCLP/SPLP LEB, Field | | ≥ CRQL and ≥ Blank Result | Use professional judgment |
| | Grossly high | Detect | Report at sample results and qualify as unusable (R) |
| | TIC > 5.0 ug/L (water) or 0.0050 mg/L (TCLP leachate) or TIC > 170 ug/Kg (soil) | Detect | Use professional judgment |

List samples qualified

| CONTAMINATION SOURCE/LEVEL | COMPOUND | CONC/UNITS | AL/UNITS | SQL | AFFECTED SAMPLES |
|----------------------------|----------|------------|----------|--|---------------------|
| 300RCE/LEVEL | | | | | SAMPLES |
| | | | | 1000 | |
| | | | | | |
| | | | + | | |
| | | 500 | | | |
| | 200 | | | | |
| | (C) | | | | |
| The second second | | | | | |
| | | | | | |

%R > Upper Acceptance Limit

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

No qualification

SURROGATE SPIKE RECOVERIES - DEUTERATED MONITORING COMPOUNDS (DMCs)

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries – deuterated monitoring compounds. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

Notes: Recoveries for DMCs in samples and blanks must be within the limits specified in Table 6.

The recovery limits for any of the compounds listed in Table 6 may be expanded at any time during the period of performance if USEPA determines that the limits are too restrictive.

If a DMC is not added in the samples and blanks or the concentrations of DMCs in the samples and blank not the specified, use professional judgment in qualifying the data.

 Action

 Detect
 Non-detect

 %R < 10% (excluding DMCs with 10% as a lower acceptance limit)</th>
 J R

 $10\% \le \%R$ (excluding DMCs with 10% as a lower acceptance limit) < Lower Acceptance Limit</td>
 J UJ

 Lower Acceptance limit $\le \%R \le Upper Acceptance Limit$ No qualification
 No qualification

Table 7. DMC Actions for Semivolatile Analysis

List the percent recoveries (%Rs) which do not meet the criteria for DMCs (surrogate) recovery.

| Matrix:Groundwater_ | | |
|---------------------|--|--------|
| SAMPLE ID | SURROGATE COMPOUND | ACTION |
| _this_documentNonc | red_criteria_in_all_samples_analyzed_except_fdeuterated_surrogates_added_to_the_samples_ _in_the_cases_described_in_this_document | |
| | | |

Note: Surrogate standards not recovered in samples FA41752-2 and FA41752-4 due to dilution. No action taken, professional judgment.

Table 8. Semivolatile DMCs and the Associated Target Analytes

| 1,4-Dioxane-d ₈ (DMC-1) | Phenol-d ₅ (DMC-2) | Bis(2-Chloroethyl) ether-d8 |
|---|--------------------------------------|---------------------------------------|
| | | (DMC-3) |
| 1,4-Dioxane | Benzaldehyde | Bis(2-chloroethyl)ether |
| | Phenol | 2,2'-Oxybis(1-chloropropane) |
| | | Bis(2-chloroethoxy)methane |
| 2-Chlorophenol-d ₄ (DMC-4) | 4-Methylphenol-da (DMC-5) | 4-Chloroaniline-d4(DMC-6) |
| 2-Chlorophenol | 2-Methylphenol | 4-Chloroaniline |
| | 3-Methylphenol | Hexachlorocyclopentadiene |
| | 4-Methylphenol | Dichlorobenzidine |
| | 2,4-Dimethylphenol | |
| Nitrobenzene-d ₅ (DMC-7) | 2-Nitrophenol-d ₄ (DMC-8) | 2,4-Dichlorophenol-d3(DMC-9) |
| Acetophenone | Isophorone | 2,4-Dichlorophenol |
| N-Nitroso-di-n-propylamine | 2-Nitrophenol | Hexachlorobutadiene |
| Hexachloroethane | | Hexachlorocyclopentadiene |
| Nitrobenzene | | 4-Chloro-3-methylphenol |
| 2,6-Dinitrotoluene | | 2,4,6-Trichlorophenol |
| 2,4-Dinitrotoluene | | 2,4,5-Trichlorophenol |
| N-Nitrosodiphenylamine | | 1,2,4,5-Tetrachlorobenzene |
| | | *Pentachlorophenol |
| | | 2,3,4,6-Tetrachlorophenol |
| Dimethylphthalate-d ₆ (DMC-10) | Acenaphthylene-da(DMC-i1) | 4-Nitrophenol-d ₄ (DMC-12) |
| Caprolactam | *Naphthalene | 2-Nitroaniline |
| 1,1'-Biphenyl | *2-Methylnaphthalene | 3-Nitroaniline |
| Dimethylphthalate | 2-Chloronaphthalene | 2,4-Dinitrophenol |
| Diethylphthalate | *Acenaphthylene | 4-Nitrophenol |
| Di-n-butylphthalate | *Acenaphthene | 4-Nitroaniline |
| Butylbenzylphthalate | | |
| Bis(2-ethylhexyl) phthalate | | |
| Di-n-octylphthalate | | |

| Fluorene-d ₁₀ (DMC-13) | 4,6-Dinitro-2-methylphenol-d₂ (DMC-14) | Anthracene-d ₁₀ (DMC-15) | | |
|--|---|-------------------------------------|--|--|
| Dibenzofuran *Fluorene | 4,6-Dinitro-2-methylphenol | Hexachlorobenzene Atrazine | | |
| 4-Chlorophenyl-phenylether | | *Phenanthrene | | |
| 4-Bromophenyl-phenylether Carbazole | | *Anthracene | | |
| Pyrene-d ₁₀ (DMC-16) | Benzo(a)pyrene-d ₁₂ (DMC-17) | | | |
| *Fluoranthene | 3,3'-Dichtorobenzidine | | | |
| *Pyrene | *Benzo(b)fluoranthene | | | |
| *Benzo(a)anthracene | *Benzo(k)fluoranthene | | | |
| *Chrysene | *Benzo(a)pyrene | | | |
| | *Indeno(1,2,3-cd)pyrene | | | |
| | *Dibenzo(a,h)anthracene | | | |
| _ | *Benzo(g,h,i)perylene | | | |

^{*}Included in optional Target Analyte List (TAL) of PAHs and PCP only.

Table 9. Semivolatile SIM DMCs and the Associated Target Analytes

| Fluoranthene-d10 (DMC-1) | 2-Methylnaphthalene-d10 (DMC-2) | | |
|-----------------------------|------------------------------------|--|--|
| Fluoranthene | Naphthalene | | |
| Pyrene | 2-Methylnaphthalene | | |
| Benzo(a)anthracene | Acenaphthylene | | |
| Chrysene | Acenaphthene | | |
| Benzo(b)fluoranthene | Fluorene | | |
| Benzo(k)fluoranthene | Pentachlorophenol | | |
| Benzo(a)pyrene | Phenanthrene | | |
| Indeno(1,2,3-cd)pyrene | Anthracene | | |
| Dibenzo(a,h)anthracene | | | |
| Benzo(g,h,i)perylene | | | |

| All criteria were met | |
|-----------------------|----|
| Criteria were not met | |
| and/or see below | _X |

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

NOTES:

Data for MS and MSDs will not be present unless requested by the Region. Notify the Contract Laboratory COR if a field or trip blank was used for the MS and MSD.

For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

List the %Rs, RPD of the compounds which do not meet the criteria.

| Sample ID:FA41752-2 | Matrix/Level:Groundwater_ |
|---------------------------|---------------------------|
| Sample ID:JC41752-2_(SIM) | Matrix/Level:Groundwater_ |
| Sample ID:JC41752-2_(SIM) | Matrix/Level:Groundwater_ |
| Sample ID:JC41854-2_(SIM) | Matrix/Level:Groundwater_ |

The QC reported here applies to the following samples:

Method: SW846 8270D SIM FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7; FA41752-8, FA41752-9, FA41752-10

| | FA417 | 752-2 | Spike | MS | MS | Spike | MSD | MSD | | Limits |
|-------------|-------|-------|-------|------|-------|--------|------|-------|------|----------|
| Compound | ug/l | Q | ug/l | ug/l | % | ug/l | ug/l | % | RPD | Rec/RPD |
| 1,4-dioxane | 791 | В | 19.2 | 1230 | 2283* | a 19.2 | 1060 | 1399* | a 15 | 15-69/31 |

a – outside control limit due to high level in sample relative to amount spiked.

MS/MSD % recovery and RPD within laboratory control limits except for the cases described in this document.

Results for 1,4-dioxane not qualified.

- QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- If QC limits are not available, use limits of 70 130 %.

^{* -} outside laboratory control limits

Actions:

| QUALITY | %R < LL | %R > UL |
|--------------------|---------|---------|
| Positive results | J | J |
| Nondetects results | R | Accept |

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).

If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J). If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

| All criteria were met _X | |
|--------------------------|--|
| Criteria were not met | |
| and/or see below | |

INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

List the internal standard area of samples which do not meet the criteria.

| DATE | SAMPLE ID | IS OUT | IS AREA | ACCEPTABLE RANGE | ACTION |
|------------|--------------------|-----------------------|---------------------|------------------------|-----------|
| Internal a | rea meets the requ | uired criteria for ba | atch samples corres | sponding to this data | package. |
| | | | | portaing to title data | pad.tago. |
| | | | | | |
| | | | | | |
| | | | | | |

Action:

- If an internal standard area count for a sample or blank is greater than 213.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration) (see Table 10 below):
 - a. Qualify detects for compounds quantitated using that internal standard as estimated low (J-).
 - b. Do not qualify non-detected associated compounds.
- 2. If an internal standard area count for a sample or blank is less than 20.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration):
 - a. Qualify detects for compounds quantitated using that internal standard as estimated high (J+).
 - b. Qualify non-detected associated compounds as unusable (R).
- 3. If an internal standard area count for a sample or blank is greater than or equal to 50.0%, and less than or equal to 213% of the area for the associated standard opening CCV or mid-point standard from initial calibration, no qualification of the data is necessary.
- 4. If an internal standard RT varies by more than 10.0 seconds: Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.
- 5. If an internal standard RT varies by less than or equal to 10.0 seconds, no qualification of the data is necessary.

Note: Inform the Contract Laboratory Program Project Officer (CLP PO) if the internal standard performance criteria are grossly exceeded. Note in the Data Review Narrative potential effects on the data resulting from unacceptable internal standard performance.

State in the Data Review Narrative if the required internal standard compounds are not added to a sample or blank or if the required internal standard compound is not analyzed at the specified concentration.

Actions:

Table 10. Internal Standard Actions for Semivolatile Analysis

| Criteria | Action | |
|--|------------------|------------------|
| Criteria | Detect | Non-detect |
| Area response < 20% of the opening CCV or mid-point standard CS3 from ICAL | J+ | R |
| 20% ≤ Area response < 50% of the opening CCV or mid-point standard CS3 from ICAL | J±: | ÚJ |
| 50% ≤ Area response ≤ 200% of the opening CCV or mid-point standard CS3 from ICAL | No qualification | No qualification |
| Area response > 200% of the opening CCV or mid-point standard CS3 from ICAL | J- | No qualification |
| RT shift between sample/blank and opening CCV or mid-point standard CS3 from ICAL > 10.0 seconds | R | R |
| RT shift between sample/blank and opening CCV or mid-point standard CS3 from ICAL < 10.0 seconds | No qualification | No qualification |

| | | Criteria were met Criteria were not met and/or see below |
|----------------|---|--|
| TARGET CO | MPOUND IDENTIFICATION | |
| Criteria: | | |
| | e Retention Times (RRTs) of reported compound Continuing Calibration Verification (CCV | |
| List compound | ds not meeting the criteria described above: | |
| Sample ID | Compounds | Actions |
| | | |
| | | |
| spectrum from | must be present in the sample spectrum. The relative intensities of these ions must a sample spectra (e.g., for an ion with an at the corresponding sample ion abundance more present at greater than 10% in the sample ions present at greater than 10% in the sample ions. | ing CCV or mid-point standard from initial trum at a relative intensity greater than 10% gree within ±20% between the standard and bundance of 50% in the standard spectrum, |
| List compound | ds not meeting the criteria described above: | |
| Sample ID | Compounds | Actions |
| _ldentified_co | mpounds_meet_the_required_criteria | |

Action:

- 1. The application of qualitative criteria for GC/MS analysis of target compounds requires professional judgment. It is up to the reviewer's discretion to obtain additional information from the laboratory. If it is determined that incorrect identifications were made, qualify all such data as unusable (R).
- 2. Use professional judgment to qualify the data if it is determined that cross-contamination has occurred.
- 3. Note in the Data Review Narrative any changes made to the reported compounds or concerns regarding target compound identifications. Note, for Contract Laboratory COR action, the necessity for numerous or significant changes.

TENTATIVELY IDENTIFIED COMPOUNDS (TICS)

NOTE: Tentatively identified compounds should only be evaluated when requested by a party from outside of the Hazardous Waste Support Section (HWSS).

| Li | - | 11 00 |
|----|---|-------|
| | | |
| | | I Lan |

| Sample ID | Compound | Sample ID | Compound |
|--|-----------------|-----------|----------|
| | | | |
| | | | |
| THE RESERVE AND ADDRESS OF THE PERSON NAMED IN COLUMN TWO IN COLUMN TO THE PERSON NAMED IN COLUM | and the same of | | |

Action:

- 1. Qualify all TIC results for which there is presumptive evidence of a match (e.g. greater than or equal to 85% match) as tentatively identified (NJ), with approximated concentrations. TICs labeled "unknown" are qualified as estimated (J).
- 2. General actions related to the review of TIC results are as follows:
 - a. If it is determined that a tentative identification of a non-target compound is unacceptable, change the tentative identification to "unknown" or another appropriate identification, and qualify the result as estimated (J).
 - b. If all contractually-required peaks were not library searched and quantitated, the Region's designated representative may request these data from the laboratory.
- In deciding whether a library search result for a TIC represents a reasonable identification, use professional judgment. If there is more than one possible match, report the result as "either compound X or compound Y". If there is a lack of isomer specificity, change the TIC result to a nonspecific isomer result (e.g., 1,3,5-trimethyl benzene to trimethyl benzene isomer) or to a compound class (e.g., 2-methyl, 3-ethyl benzene to a substituted aromatic compound).
- 4. The reviewer may elect to report all similar compounds as a total (e.g., all alkanes may be summarized and reported as total hydrocarbons).

- 5. Target compounds from other fractions and suspected laboratory contaminants should be marked as "non-reportable".
- 6. Other Case factors may influence TIC judgments. If a sample TIC match is poor, but other samples have a TIC with a valid library match, similar RRT, and the same ions, infer identification information from the other sample TIC results.
- 7. Note in the Data Review Narrative any changes made to the reported data or any concerns regarding TIC identifications.
- 8. Note, for Contract Laboratory COR action, failure to properly evaluate and report TICs

| All criteria were metX | | |
|------------------------|--|--|
| Criteria were not met | | |
| and/or see below | | |

SAMPLE QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

Action:

- 1. When a sample is analyzed at more than one dilution, the lower CRQL are used unless a QC exceedance dictates the use of higher CRQLs from the diluted sample. Samples reported with an "E" qualifier should be reported from the diluted sample.
- 2. If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.
- 3. For non-aqueous samples, if the solids is less than 10.0%, use professional judgment for both detects and non-detects. If the percent solid for a soil sample is greater than or equal to 10.0% and less than 30.0%, use professional judgment to qualify detects and non-detects. If the percent solid for a soil sample is greater than or equal to 30.0%, detects and non-detects should not be qualified (see Table 11).
- 4. Note, for Contract Laboratory COR action, numerous or significant failures to accurately quantify the target compounds or to properly evaluate and adjust CRQLs.
- 5. Results between MDL and CRQL should be qualified as estimated "J".
- 6. Results < MDL should be reported at the CRQL and qualified "U". MDLs themselves should not be reported.

Table 11. Percent Solids Actions for Semivolatile Analysis for Non-Aqueous Samples

| Criteria - | Ac | Action | | |
|-------------------------|---------------------------|---------------------------|--|--|
| | Detects | Non-detects | | |
| %Solids < 10.0% | Use professional judgment | Use professional judgment | | |
| 10.0% ≤ %Solids ≤ 30.0% | Use professional judgment | Use professional judgment | | |
| %Solids > 30.0% | No qualification | No qualification | | |

SAMPLE QUANTITATION

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

QUANTITATION LIMITS

A. Dilution performed

| SAMPLE ID | DILUTION | REASON FOR DILUTION |
|--|----------|------------------------------------|
| | FACTOR | |
| EA44750.0 | | 4.4 Discuss successible discussion |
| FA41752-2 | 100 x | 1,4-Dioxane over calibration range |
| FA41752-4 | 100 x | 1,4-Dioxane over calibration range |
| FA41752-9 | 2 x | 1,4-Dioxane over calibration range |
| FA41752-10 | 2 x | 1,4-Dioxane over calibration range |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | 1 | |
| | Value | |
| The state of the s | 1 | |
| | | |
| | | |
| | | |

| | All criteria were met Criteria were not met and/or see belowN/A |
|---------------------------|---|
| FIELD DUPLICATE PRECISION | |
| Sample IDs: | |

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

Suggested criteria: if large RPD (> 50 %) is observed, confirm identification of the samples and note differences. If both samples and duplicate are <5 SQL, the RPD criteria is doubled.

| COMPOUND | SQL ug/L | SAMPLE CONC. (ug/l) | DUPLICATE CONC. (ug/l) | RPD | ACTION |
|--|-------------|------------------------|---------------------------|-----|--------|
| | | | | | |
| No field/laboratory duplicate analyzed as part of this data package. MS/MSD % recovery RPD used to assess precision. RPD within the required guidance document criteria < 50 % for detected target analytes above 5 SQL. | | | | | |
| | | | | | |

| All criteria were met _ | X_ | |
|-------------------------|----|--|
| Criteria were not met | | |
| and/or see below | _ | |

OTHER ISSUES

| | | performance during simple analysis: |
|-----------------------|---|---|
| Sample ID ======== | Comments | Actions |
| | | |
| Marie Silver Francis | | |
| Action: | | |
| during sample analy | | nined that system performance has degraded y Program COR any action as a result of cted the data. |
| | | |
| 3. Overall Asses | ssment of Data | |
| | ssment of Data d based on other issues: | |
| | | Actions |

- Action:
- 1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
- 2. Write a brief narrative to give the user an indication of the analytical limitations of the data. Inform the Contract Laboratory COR the action, any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

- 3. Sometimes, due to dilutions, re-analysis or SIM/Scan runs are being performed, there will be multiple results for a single analyte from a single sample. The following criteria and professional judgment are used to determine which result should be reported:
 - The analysis with the lower CRQL
 - The analysis with the better QC results
 - The analysis with the higher results

EXECUTIVE NARRATIVE

SDG No:

FA41752

Laboratory:

Accutest, Orlando

Analysis:

MADEP VPH

Number of Samples:

12

Location:

BMSMC, Humacao, PR

SUMMARY:

Twelve (12) samples were analyzed for Volatiles TPHC Ranges by method MADEP VPH. Samples were validated following the METHOD FOR THE DETERMINATION OF VOLATILE PETROLEUM HYDROCARBONS (VPH) quality control criteria, Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

primary guidance document, diffess otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues:

None

Major:

None

Minor:

None

Critical findings:

None

Major findings:

None

Minor findings:

1. MS/MSD % recovery and RPD within laboratory control limits except for the cases

described in the Data Review Worksheet. Results for C9- C10 Aromatics (Unadj.) were

qualified as estimated (J) in sample FA41752-2.

COMMENTS:

Results are valid and can be used for decision making purposes.

Reviewers Name:

Rafael Infante

Chemist License 1888

Signature:

Date: April 18, 2017

ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA41752-1

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Equipment Blank

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 100 C9 - C10 Aromatics (Unadj.)

Sample ID: FA41752-2

Sample location: BMSMC, Humacao, PR

Matrix: Groundwater

Sampling date: 3/1/2017

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

100 C9 - C10 Aromatics (Unadj.)

Sample ID: FA41752-3

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Field Blank Water

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ug/L 100 C9 - C10 Aromatics (Unadj.)

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result **Analyte Name**

C9 - C10 Aromatics (Unadj.) 100 ug/L

Sample ID: FA41752-5

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: AQ - Equipment Blank

METHOD: MADEP VPH

Units Difution Factor Lab Flag Validation Reportable Result Analyte Name

C9 - C10 Aromatics (Unadj.) 100 ug/L

Sample ID: FA41752-6

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

C9 - C10 Aromatics (Unadj.)

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

C9 - C10 Aromatics (Unadj.) 100 ug/L

Sample ID: FA41752-8

Sampling date: 3/2/2017

Sample location: BMSMC, Humacao, PR

Matrix: Groundwater

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

C9 - C10 Aromatics (Unadj.) 100 ug/L 1.0 -

Sample ID: FA41752-9

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

C9 - C10 Aromatics (Unadj.)

Sample location: BMSMC, Humacao, PR

3/2/2017 Sampling date:

Matrix: Groundwater

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 100 C9 - C10 Aromatics (Unadj.)

Sample ID: FA41752-2MS (03/09/17)

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

1.0

ug/L

86.1 C9 - C10 Aromatics (Unadj.) Sample ID: FA41752-2MSD (03/09/17)

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017 Matrix: Groundwater 3/1/2017

METHOD: MADEP VPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

86.0 C9 - C10 Aromatics (Unadj.)

| Type of validation | n Full:X | Project Number: FA41752 |
|---|--|--|
| . , , , , , , , , , , , , , , , , , , , | Limited: | Project Number:_FA41752 Date:03/01-02/2017 |
| | | Shipping date:03/02/2017 |
| | | EPA Region:2 |
| REVIEW | OF VOLATILE PETROL | EUM HYDROCARBON (VPHs) PACKAGE |
| actions. This docu informed decision assessed according METHOD FOR TH Massachusetts De validation guideling criteria and data | iment will assist the reviand in better serving the ground to the data validation guite DETERMINATION OF partment of Environment of promulgated by the L | e organics were created to delineate required validation riewer in using professional judgment to make more e needs of the data users. The sample results were sidance documents in the following order of precedence VOLATILE PETROLEUM HYDROCARBONS (VPH), tal Protection, Revision 1.1 (2004). Also the general JSEPA Hazardous Wastes Support Section. The QC on the data review worksheets are from the primary |
| The hardcopied (la received has been review for VOCs income) | reviewed and the quality | _LaboratoriesOrlando data package control and performance data summarized. The data |
| No. of Samples: Field blank No.: Equipment blank N | 12 FA41752-3;_FA41 o.: FA41752-1;_FA41 | Sample matrix:Groundwater |
| X Blanks X Surrogate | imes uning tandard Performance | X Laboratory Control SpikesX Field DuplicatesX CalibrationsX Compound IdentificationsX Compound QuantitationX Quantitation Limits |
| Overall Comments (Unadj.)) | : _Volatiles_by_GC_by_N | Method_MADEP_VPH,_REV_1.1(C9- C10 Aromatics |
| | | |
| | AVGC | |
| | | |
| Definition of Qualific | ers: | |
| J- Estimated | results | |
| U- Compound | not detected | |
| R- Rejected da UJ- Estimated r | | |
| Reviewer: | al agant | |
| | 18,_2017 | |

| | Criteria were no | All criteria were metx ot met and/or see below |
|-------------------------------------|---------------------|---|
| l. DATA COMPLETNE A. Data Packag | | |
| MISSING INFORMATION | DATE LAB. CONTACTED | DATE RECEIVED |
| | | |
| | | |
| | | |
| | | |
| 3. Other | | Discrepancies: |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| All criteria were met | _X |
|--|----|
| Criteria were not met and/or see below | |

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of extraction, and subsequently from the time of extraction to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

| SAMPLE ID | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | ACTION |
|-------------|-----------------|-----------------------------------|------------------|--------------------|
| | | | | |
| | <u> </u> | | | |
| Samples ana | | nod recommende ithin the required | | ample preservation |
| | | la initiatio regalited | ontona. | |
| | | | | |
| | | | | |

Criteria

Preservation:

Samples analyzed with ambient purge temperature: Samples must be acidified to a pH of 2.0 or less at the time of collection.

Samples analyzed with heated purge temperature: Samples must be treated to a pH of 11.0 or greater at the time of collection.

Methanol preservation of soil/sediment samples is mandatory. Methanol (purgeand-trap grade) must be added to the sample vial before or immediately after sample collection. In lieu of the in-field preservation of samples with methanol, soil samples may be obtained in specially-designed air tight sampling devices, provided that the samples are extruded and preserved in methanol within 48 hours of collection.

Holding times:

Aqueous samples using ambient or heated purge - analyze within 14 days. Soil/sediment samples - analysis within 28 days.

| | Cooler temperature | (Criteria: 4 + 2 ° | 'C):3.7-4.1_°(| D |
|--|--------------------|--------------------|----------------|---|
|--|--------------------|--------------------|----------------|---|

Actions: Qualify positive results/non-detects as follows:

If holding times are exceeded, estimate positive results (J) and nondetects (UJ).

If holding times are grossly exceeded, use professional judgment to qualify data. The data reviewer may choose to estimate positive results (J) and rejects nondetects (R).

If samples were not at the proper temperature (> 10°C) or improperly preserved, use professional judgment to qualify the results.

| | | | All crit | eria were metX_ | |
|----------|--|------------------------|----------------------------------|---------------------|----|
| | | C | riteria were not met ar | nd/or see below | _ |
| CALIBRAT | IONS VERIFIC | ATION | | | |
| | Compliance requirements for satisfactory instrument calibration are established to ensur that the instrument is capable of producing and maintaining acceptable quantitative data. | | | | re |
| | | Date of initial cal | ibration:03/06/17_ | | _ |
| | | Dates of initial ca | alibration verification:_ | _03/06/17 | _ |
| | | Instrument ID n | umbers: | VOA10 | |
| | | Matrix/Level: | AQUEOUS/ | MEDIUM | |
| | | | | | |
| DATE | LAB FILE ID# | ANALYTE | CRITERIA OUT RFs, %RSD, %D, r | SAMPLES AFFECTED | |
| | | | | | |
| Initi | al and initial ca | libration verification | meet method specific | requirements | |
| | | | | | |

Criteria- ICAL

- Five point calibration curve.
- The percent relative standard deviation (%RSD) of the calibration factor must be equal to or less than 25% over the working range for the analyte of interest. When this condition is met, linearity through the origin may be assumed, and the average calibration factor is used in lieu of a calibration curve.
- A collective calibration factor must also be established for each hydrocarbon range
 of interest. Calculate the collective CFs for C5-C8 Aliphatic Hydrocarbons and C9C12 Aliphatic Hydrocarbons using the FID chromatogram. Calculate the collective
 CF for the C9-C10 Aromatic Hydrocarbons using the PID chromatogram. Tabulate
 the summation of the peak areas of all components in that fraction against the total
 concentration injected. The %RSD of the calibration factor must be equal to or less
 than 25% over the working range for the hydrocarbon range of interest.

Criteria- CCAL

- At a minimum, the working calibration factor must be verified on each working day, after every 20 samples, and at the end of the analytical sequence by the injection of a mid-level continuing calibration standard to verify instrument performance and linearity.
- If the percent difference (%D) for any analyte varies from the predicted response by more than ±25%, a new five-point calibration must be performed for that analyte. Greater percent differences are permissible for n-nonane. If the %D for n-nonane is greater than 30, note the nonconformance in the case narrative. It should be noted that the %Ds are calculated when CFs are used for the initial calibration and

percent drifts are calculated when calibration curves using linear regression are used for the initial calibration.

Actions:

If %RSD > 25% for target compounds or a correlation coefficient < 0.99, estimate positive results (J) and use professional judgment to qualify nondetects. If % D > 25% (> 30 for nonane), estimate positive results (J) and nondetects (UJ).

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

| Date of initial calibration: | _03/06/17 |
|---|--------------------|
| Dates of continuing calibration verification: | 03/09/17 |
| Dates of final calibration verification: | 03/06/17:_03/10/17 |
| Instrument ID numbers: | VOA10 |
| Matrix/Level: AQL | JEOUS/MEDIUM |

| DATE | LAB FILE ID# | ANALYTE | CRITERIA OUT RFs, %RSD, %D, r | SAMPLES AFFECTED |
|------|-----------------|---------------|----------------------------------|--|
| | | | | |
| | | | | Control of the Contro |
| | | | 1000 | |
| | | period period | | |
| 100 | 2000 | | | |
| | | | | |

Note: Continuing and final calibration verification meets method specific requirements.

A separate worksheet should be filled for each initial curve

| | | | Criteria were n | All criteria were met _ ot met and/or see below | |
|---|---|--|---|---|---|
| | | | | ot met and/or see below | |
| V A. BLAN | K ANALYSIS R | ESULTS (Se | ctions 1 & 2) | | |
| of contamina associated w with any blar determine wh problem is a | ition problems. ith the samples nks exist, all d nether or not th n isolated occu after samples s | The criteria s, including tri ata associate ere is an inhour arrence not a | for evaluation of p, equipment, and d with the case erent variability in offecting other da | ne the existence and many blanks apply only to disport the laboratory blanks. If promust be carefully evaluated the data for the case, of the case, of the case, of the case aminated to determine if | blanks roblems lated to or if the d Blank |
| List the conta separately. | amination in th | e blanks beld | ow. High and low | levels blanks must be | treated |
| Laboratory bla | anks | | | | |
| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS | N |
| _METHOD_B | LANKS_MEET | _THE_METH | OD_SPECIFIC_C | CRITERIA | |
| | | | | | |
| | | | | | |
| | | | | | |
| Note: | | | | | |
| Field/Trip/Eq | <u>uipment</u> | | | | |
| A methanol treach soil/sed and analysis. | rip blank or aci iment sample o | dified reagen or water samp | t water trip blank ble batch, respect | should continually acco | ompany storage, |
| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS | |
| _NO_TARGE | T_ANALYTE_0 | DETECTED_I | | ACKAGE. QUIPMENT_BLANKS | |
| | | | | | |
| Note: | | | | | |

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. Peaks must not be detected above the Reporting Limit within the retention time window of any analyte of interest. The hydrocarbon ranges must not be detected at a concentration greater than 10% of the most stringent MCP cleanup standard. Specific actions area as follows:

If the concentration is < sample quantitation limit (SQL) and < AL, report the compound as not detected (U) at the SQL.

If the concentration is \geq SQL but < AL, report the compound as not detected (U) at the reported concentration.

If the concentration is > AL, report the concentration unqualified.

CAMBLEID

| All criteria were met | X |
|--|---|
| Criteria were not met and/or see below | |

ACTION

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery. Matrix: solid/aqueous

CURROCATE COMPOUND

| | BFB | OUND | | ACTION |
|-----------------------------|-----------------|----------|--------------|-------------|
| _SURROGATE_S _LIMITS | STANDARD_RECOVE | RIES_WIT | HIN_LABORATO | DRY_CONTROL |
| | | 2741112 | | |
| QC Limits* (Aque | 70_to_130_ | to | to | |
| QC Limits* (Solid) LL_to_UL | | to | to | |

It is recommended that surrogate standard recoveries be monitored and documented on a continuing basis. At a minimum, when surrogate recovery from a sample, blank, or QC sample is less than 70% or more than 130%, check calculations to locate possible errors, check the fortifying standard solution for degradation, and check changes in instrument performance.

If the cause cannot be determined, reanalyze the sample unless one of the following exceptions applies:

- (1) Obvious interference is present on the chromatogram (e.g., unresolved complex mixture);
- (2) Percent moisture of associated soil/sediment sample is >25% and surrogate recovery is >10%; or
- (3) The surrogate exhibits high recovery and associated target analytes or hydrocarbon ranges are not detected in sample.

If a sample with a surrogate recovery outside of the acceptable range is not reanalyzed based on any of these aforementioned exceptions, this information must be noted on the data report form and discussed in the Executive Report. Analysis of the sample on dilution may diminish matrix-related surrogate recovery problems. This approach can be used as long as the reporting limits to evaluate applicable MCP standards can still be achieved with the dilution. If not, reanalysis without dilution must be performed.

| All criteria were met _ | |
|--|---|
| Criteria were not met and/or see below | Χ |

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

At the request of the data user, and in consideration of sample matrices and data quality objectives, matrix spikes and matrix duplicates may be analyzed with every batch of 20 samples or less per matrix.

- Matrix duplicate Matrix duplicates are prepared by analyzing one sample in duplicate. The purpose of the matrix duplicates is to determine the homogeneity of the sample matrix as well as analytical precision. The RPD of detected results in the matrix duplicate samples must not exceed 50 when the results are greater than 5x the reporting limit.
- The desired spiking level is 50% of the highest calibration standard. However, the total concentration in the MS (including the MS and native concentration in the unspiked sample) should not exceed 75% of the highest calibration standard in order for a proper evaluation to be performed. The purpose of the matrix spike is to determine whether the sample matrix contributes bias to the analytical results. The corrected concentrations of each analyte within the matrix spiking solution must be within 70 130% of the true value. Lower recoveries of n-nonane are permissible (if included in the calibration of the C9-C12 aliphatic range), but must be noted in the narrative if <30%.</p>

MS/MSD Recoveries and Precision Criteria

List the %Rs, RPD of the compounds which do not meet the QC criteria.

The QC reported here applies to the following samples:

FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8, FA41752-9, FA41752-10

| | FA417 | 52-2 | Spike | MS | MS | Spike | MSD | MSD | | Limits |
|---------------|-------|------|-------|------|-----|-------|------|-----|-----|-----------|
| Compound | ug/l | Q | ug/l | ug/l | % | ug/l | ug/l | % | RPD | Rec/RPD |
| C9- C10 Aroma | tics | | - | _ | | _ | _ | | | |
| (Unadj.) | ND | | 240 | 86.1 | 36* | 240 | 86.0 | 36* | 0 | 70-130/50 |

^{*} Outside laboratory control limits.

Note:

MS/MSD % recovery and RPD within laboratory control limits except for the cases described in this document. Results for C9- C10 Aromatics (Unadj.) were qualified as estimated (J) in sample FA41752-2.

No action is taken on MS/MSD results alone to qualify the entire case. However, used informed professional judgment, the data reviewer may use the MS/MSD results in conjunction with other QC criteria and determine the need for some qualification of the data. In those instances where it can be determined that the results of the MS/MSD affect only the sample spiked, the qualification should be limited to this sample alone. However, it may be determined through the MS/MSD results that the laboratory is having a systematic problem in the analysis of one or more analytes, which affects the associated samples.

2. MS/MSD – Unspiked Compounds

List the concentrations of the unspiked compounds and determine the % RSDs of these compounds in the unspiked sample, matrix spike, and matrix spike duplicate.

| COMPOU | JND | NCENT MPLE | | N IS | MSD | %RPD | ACTION |
|--------|-----|---------------|---------|---------|---------|------|--------|
| | | | | | | 9555 | |
| | | - | SELECT. | y | E COLOR | | |
| | N | | | | | | |

Criteria: None specified, use %RSD ≤ 50 as professional judgment.

Actions:

If the % RSD > 50, qualify the results in the spiked sample as estimate (J). If the % RSD is not calculable (NC) due to nondetect value in the sample, MS, and/or MSD, use professional judgment to qualify sample data.

A separate worksheet should be used for each MS/MSD pair.

| All criteria were metX | |
|--|--|
| Criteria were not met and/or see below | |

VIII. LABORATORY CONTROL SAMPLE (LCS/LCSD) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

List the %R of compounds which do not meet the criteria

| LCS ID | COMPOUND | % R | QC LIMIT | ACTION |
|----------|------------------|--------------|------------|--------|
| LCS/LCSD | _RECOVERY_WITHIN | I_LABORATOF | RY_CONTROL | _LIMTS |
| | | | | |
| | | W. All Tooks | - 10 100 | |
| - | | | | |

Criteria:

- Refer to QAPP for specific criteria.
- * The spike recovery must be between 70% and 130%. Lower recoveries of n-nonane are permissible (if included in the calibration of the C9-C12 aliphatic range). If the recovery of n-nonane is <30%, note the nonconformance in the executive narrative.

Actions:

Actions on LCS recovery should be based on both the number of compounds that are outside the %R criteria and the magnitude of the excedance of the criteria.

If the %R of the analyte is > UL, qualify all positive results (j) for the affected analyte in the associated samples and accept nondetects.

If the %R of the analyte is < LL, qualify all positive results (j) and reject (R) nondetects for the affected analyte in the associated samples.

If more than half the compounds in the LCS are not within the required recovery criteria, qualify all positive results as (J) and reject nondetects (R) for all target analyte(s) in the associated samples.

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix (1 per 20 samples per matrix)? Yes or No.

If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected. Discuss the actions below:

| | | Crite | All ria were not met and | | were met belowN/A | |
|---|--|--|--|-------------------------------|--|--|
| IX. FIELD/LAE | BORATOR | Y DUPLICATE PR | ECISION | | | |
| Sample IDs: | | | 1 | Matrix:_ | | |
| precision. These a have more varia performance. It is | analyses m ability that also expec | neasure both field in laboratory duported that soil dupliced that soil dupliced. | ken and analyzed as and lab precision; th blicates which mea cate results will have h collecting identical | erefore, asures a great | the results may only laboratory er variance than | |
| COMPOUND | SQL | SAMPLE CONC. | DUPLICATE CONC. | RPD | ACTION | |
| used to assess | precision. | RPD within labora | data package. MS/N tory and validation g ected above reporting | uidance | | |
| | | | | | | |
| RPD + 30% for aq | ueous sam | nples, RPD <u>+</u> 50 % | ct-specific information for solid samples if RPD criteria is doubl | results a | are ≥ SQL. | |
| SQL = soil quantita | ation limit | | | | | |
| Actions: | | | | | | |
| If both the sample (NC). No action is | | uplicate results are | e nondetects (ND), th | ne RPD | is not calculable | |
| Qualify as estimatexceeded the above | • | ve results (J) and | d nondetects (UJ) | for the | compound that | |
| If one sample resu | ılt is not de | tected and the oth | er is ≥ 5x the SQL q | ualify (J | /UJ). | |
| | Note: If SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate. | | | | | |

If one sample value is not detected and the other is < 5x the SQL, use professional judgment to determine if qualification is appropriate.

| All criteria were met _ | _X |
|--|----|
| Criteria were not met and/or see below | |

XI. COMPOUND IDENTIFICATION

The compound identification evaluation is to verify that the laboratory correctly identified target analytes as well as tentatively identified compounds (TICs).

- 1. Verify that the target analytes were within the retention time windows.
 - Retention time windows must be re-established for each Target VPH
 Analyte each time a new GC column is installed, and must be verified and/or
 adjusted on a daily basis.
 - o Coelution of the m- and p- xylene isomers is permissible.
 - o All surrogates must be adequately resolved from individual Target Analytes included in the VPH Component Standard.
 - o For the purposes of this method, adequate resolution is assumed to be achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks.
 - o The n-pentane (C5) and MtBE peaks must be adequately resolved from any solvent front that may be present on the FID and PID chromatograms, respectively.

Note: Target analytes were within the retention time window.

2. If target analytes and/or TICs were not correctly identified, request that the laboratory resubmit the corrected data.

| | | Crite | All criteria were metX_ eria were not met and/or see below |
|------------------------|------------------|--|---|
| XII. | QUANTITATI | ON LIMITS AND SAMPLE R | ESULTS |
| The s | sample quantitat | ion evaluation is to verify lab | oratory quantitation results. |
| 1. | In the space b | pelow, please show a minimu | m of one sample calculation: |
| | | | |
| FID | | | |
| Com | outer printout | | |
| PID | | | |
| | outer printout | | |
| 3. | (MDLs). | • | vated accordingly by the laboratory? Li |
| | the affected s | amples and dilution factor in | the table below. |
| | SAMPLE ID | DILUTION FACTOR | REASON FOR DILUTION |
| | | | |
| | | | |
| 1 | EL | | |
| | | rformed and the results were ected compounds. List the aff | above the concentration range, estima ected samples/compounds: |
| | | | W-10-115 |

EXECUTIVE NARRATIVE

SDG No:

FA41752

Laboratory:

Accutest, Orlando

Analysis:

MADEP EPH

Number of Samples:

12

Location:

BMSMC, Humacao, PR

SUMMARY:

Twelve (12) samples were analyzed for Extractables TPHC Ranges by method MADEP EPH. Samples were validated following the METHOD FOR THE DETERMINATION OF EXTRACTABLE PETROLEUM HYDROCARBONS (EPH) quality control criteria, Massachusetts Department of Environmental Protection, Revision 1.1 (2004). Also the general validation guidelines promulgated by the USEPA Hazardous Wastes Support Section. The QC criteria and data validation actions listed on the data review worksheets

are from the primary guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues:

None

Major:

None

Minor:

None

Critical findings:

None

Major findings:

None

Minor findings:

None

COMMENTS:

Results are valid and can be used for decision making purposes.

Reviewers Name:

Rafael Infante

Chemist License 1888

Signature:

April 19, 2017

Date:

ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA41752-1

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Equipment Blank

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 190 C11 - C22 Aromatics (Unadj.) Sample ID: FA41752-2

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

200 C11 - C22 Aromatics (Unadj.)

Sample ID: FA41752-3

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Field Blank Water

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

190 C11 - C22 Aromatics (Unadj.)

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 200 C11 - C22 Aromatics (Unadj.)

Sample ID: FA41752-5 Sample location: BMSMC, Humacao, PR

Matrix: AQ - Equipment Blank

Sampling date: 3/2/2017

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

C11 - C22 Aromatics (Unadj.)

Sample ID: FA41752-6

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 200 C11 - C22 Aromatics (Unadj.)

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

C11 - C22 Aromatics (Unadj.) 190 ug/L 1.C

Sample ID: FA41752-8 Sample location: BMSMC, Humacao, PR

Matrix: AQ - Field Blank Water

3/2/2017

Sampling date:

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

C11 - C22 Aromatics (Unadj.) 200 ug/L

Sample ID: FA41752-9

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L C11 - C22 Aromatics (Unadj.)

Sample location: BMSMC, Humacao, PR

3/2/2017 Sampling date:

Matrix: Groundwater

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

200 C11 - C22 Aromatics (Unadj.)

Sample location: BMSMC, Humacao, PR

Sample ID: FA41752-2MS (03/10/17)

Matrix: Groundwater Sampling date:

3/1/2017

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

3230 C11 - C22 Aromatics (Unadj.)

Sample ID: FA41752-2MSD (03/10/17)

Sample location: BMSMC, Humacao, PR

Matrix: Groundwater Sampling date: 3/1/2017

METHOD: MADEP EPH

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 2790 C11 - C22 Aromatics (Unadj.)

| Type of va | lidation | Full:X Limited: | Project Number: Date: Shipping date: | _FA41752 _03/01-02/2017 _03/02/2017 |
|--|--|---|--|--|
| | | | EPA Region: | 22 |
| REVIE | W OF EXT | RACTABLE PETROLI | EUM HYDROCAR | BON (EPHs) PACKAGE |
| validation a more inform were assess precedence HYDROCA (2004). Als Support Se | ctions. This ned decision sed according METHOD RBONS (EP o the generation. The Q | document will assist the and in better serving ng to the data validation FOR THE DETER! H), Massachusetts Dep al validation guidelines | e reviewer in using pathe needs of the deeds | created to delineate required professional judgment to make ata users. The sample results nents in the following order of XTRACTABLE PETROLEUM mental Protection, Revision 1.1 to USEPA Hazardous Wastes on the data review worksheets |
| received ha | opied (labor is been revie SVOCs includ | ewed and the quality cor | st_Laboratories ntrol and performan | data package ce data summarized. The data |
| No. of Sam Field blank Equipment | ples: No.: blank No.: _ | FA41752 _12 _FA41752-3;_FA41752- _FA41752-1;_FA41752- - _ | 8 5 | Groundater |
| XH N/A Gr N/A In X BI X Sr | lanks urrogate Red | s g ard Performance | X LaboratorX Field DupX CalibratioX CompounX CompounX Quantitati | ns d Identifications d Quantitation |
| Overall _Extractabl _(C11C2 | e_Petroleum 22)_Aromatio | | _by_Method_MADI | Comments: EP_EPH,_REV_1.1 |
| Definition o | f Qualifiers: | | | |
| U- Cor R- Rej | imated resul mpound not lected data imated nond | detected | | |
| Reviewer:_ Date: | Rafue Apri_18,_20 | l Defaut | | |

| | Criteria were not n | All criteria were metx net and/or see below |
|----------------|---------------------|--|
| | | |
| NG INFORMATION | DATE LAB. CONTACTED | DATE RECEIVED |
| | | |
| | | |
| | | |
| Other | | Discrepancies: |
| | 7282 | |
| | | |
| | | |
| | | |
| | | |
| | A. Data Packag | DATA COMPLETNESS A. Data Package: NG INFORMATION DATE LAB. CONTACTED Other |

| All criteria were metX | |
|--|--|
| Criteria were not met and/or see below | |

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of extraction, and subsequently from the time of extraction to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

| SAMPLE ID | DATE SAMPLED | DATE EXTRACTED | DATE ANALYZED | ACTION |
|-----------|------------------|-------------------|------------------|-----------------|
| | | | | |
| Complea | autracted and an | alumad within ma | thad recommend | ad halding time |
| Samples | extracted and an | alyzed within the | triod recommend | ea nolaing time |
| | | | | |

Criteria

Preservation:

Aqueous samples must be acidified to a pH of 2.0 or less at the time of collection.

Soil samples must be cooled at 4 ± 2 °C immediately after collection.

Holding times:

Samples must be extracted within 14 days of collection, and analyzed within 40 days of extraction.

Cooler temperature (Criteria: 4 <u>+</u> 2 °C):___3.7_-_4.1_°C____

Actions: Qualify positive results/nondetects as follows:

If holding times are exceeded, estimate positive results (J) and nondetects (UJ). If holding times are grossly exceeded, use professional judgment to qualify data. The data reviewer may choose to estimate positive results (J) and rejects nondetects (R). If samples were not at the proper temperature (> 10°C) or improperly preserved, use professional judgment to qualify the results.

Note:

| | | Crite | All criteria | a were metX or see below |
|----------|--------------------|-----------------------|--|-----------------------------|
| CALIBRAT | IONS VERIFIC | ATION | | |
| | at the instrum | | nstrument calibration producing and mai | |
| Dat | e of initial calib | ration:10/29 | /16 | |
| Dat | es of initial cali | oration verification: | 10/29/16 | |
| Inst | rument ID num | bers:FID_ | 7 | |
| Mat | rix/Level: | _AQUEOUS/MEDIUI | М | |
| DATE | LAB FILE ID# | ANALYTE | CRITERIA OUT RFs, %RSD, %D, r | SAMPLES AFFECTED |
| | | | | |
| | nitial and conti | nuing calibration me | et method specific requ | uirements |
| | | | | |

Criteria- ICAL

- Five point calibration curve.
- The percent relative standard deviation (%RSD) of the calibration factor must be equal to or less than 25% over the working range for the analyte of interest. When this condition is met, linearity through the origin may be assumed, and the average calibration factor is used in lieu of a calibration curve.
- A collective calibration factor must also be established for each hydrocarbon range of interest. Calculate the collective CFs for C9-C18 Aliphatic Hydrocarbons, C19-C36 Aliphatic Hydrocarbons, and C11-C22 Aromatic Hydrocarbons using the FID chromatogram. Tabulate the summation of the peak areas of all components in that fraction against the total concentration injected. The %RSD of the calibration factor must be equal to or less than 25% over the working range for the hydrocarbon range of interest.
 - o The area for the surrogates must be subtracted from the area summation of the range in which they elute.
 - o The areas associated with naphthalene and 2-methylnaphthalene in the aliphatic range standard must be subtracted from the uncorrected collective C9-C18 Aliphatic Hydrocarbon range area prior to calculating the CF.

Criteria- CCAL

- At a minimum, the working calibration factor must be verified on each working day, after every 20 samples or every 24 hours (whichever is more frequent), and at the end of the analytical sequence by the injection of a mid-level continuing calibration standard to verify instrument performance and linearity.
- If the percent difference (%D) for any analyte varies from the predicted response by more than ±25%, a new five-point calibration must be performed for that analyte. Greater percent differences are permissible for n-nonane. If the %D for n-nonane is greater than 30, note the nonconformance in the case narrative. It should be noted that the %Ds are calculated when CFs are used for the initial calibration and percent drifts are calculated when calibration curves using linear regression are used for the initial calibration.

Actions:

If %RSD > 25% for target compounds or a correlation coefficient < 0.99, estimate positive results (J) and use professional judgment to qualify nondetects. If % D > 25% (> 30 for nonane), estimate positive results (J) and nondetects (UJ).

CALIBRATIONS VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

| Date of initial calibration: | 10/29/16 |
|---|-----------|
| Dates of continuing calibration verification: | 03/10/17 |
| Dates of final calibration verification: | _03/10/17 |
| Instrument ID numbers:FID_7 | |
| Matrix/Level:AQUEOUS/MEDIU | M |

| DATE | LAB FILE ID# | ANALYTE | CRITERIA OUT RFs, %RSD, %D, r | SAMPLES AFFECTED |
|-------|-------------------|------------------------|----------------------------------|---------------------|
| | | | | |
| li li | nitial and contin | uing calibration meets | method specific requi | rements. |
| | | | | |
| | | | | |

Note:

A separate worksheet should be filled for each initial curve

| | | | | All criteria were metX met and/or see below |
|--|---|--|---|--|
| V A. BLANK | ANALYSIS R | ESULTS (Se | ctions 1 & 2) | |
| magnitude of co blanks associate problems with a evaluated to de case, or if the p | ontamination ed with the s any blanks e termine whet problem is an must be run | problems. The camples, inclued a sist, all data the car not the isolated occurrence after sample | e criteria for evaluding trip, equipma associated with ere is an inherent currence not affects suspected of b | etermine the existence and uation of blanks apply only to lent, and laboratory blanks. If the case must be carefully a variability in the data for the sting other data. A Laboratory being highly contaminated to |
| List the contam separately. | ination in the | blanks belov | w. High and low i | evels blanks must be treated |
| Laboratory blan | ks | | | |
| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS |
| _METHOD_BLA | ANKS_MEET | _THE_METH | IOD_SPECIFIC_0 | CRITERIA. |
| Note: | | | | |
| <u>Field/</u> Trip <u>/Equi</u> | oment | | | |
| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS |
| | | | | EQUIPMENT_BLANKS |

| All criteria were metX | _ |
|--|---|
| Criteria were not met and/or see below | |

V B. BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. Peaks must not be detected above the Reporting Limit within the retention time window of any analyte of interest. The hydrocarbon ranges must not be detected at a concentration greater than 10% of the most stringent MCP cleanup standard. Specific actions area as follows:

If the concentration is < sample quantitation limit (SQL) and < AL, report the compound as not detected (U) at the SQL.

If the concentration is \geq SQL but < AL, report the compound as not detected (U) at the reported concentration.

If the concentration is > AL, report the concentration unqualified.

| All criteria were metX Criteria were not met and/or see below |
|---|
| SURROGATE SPIKE RECOVERIES |
| Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently |

subjective and demands analytical experience and professional judgment. List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery. Matrix: solid/aqueous

| SAMPLE ID | SURROG S1 | ATE COMPOU S2 | ND S3 | S4 | ACTION |
|--|--------------|-------------------|------------|---------------------------|-----------------------|
| _SURROGATE_ _LIMITS | _STANDAR | DS_RECOVER | IES_WITHIN | I_LABORAT | ORY_CONTROL |
| Note: | | | | | |
| S1 = o-Terpheny S3 = 1-Chlorood | | | | robiphenyl nonaphthale | 40-140% ne 40-140% |
| QC Limits (%)* (_LL_to_UL_ QC Limits* (Solid _LL to UL | 40_to_140_ | _40_to_140_ to | _40_to_14 | 4040_to_ to | _140 |

It is recommended that surrogate standard recoveries be monitored and documented on a continuing basis. At a minimum, when surrogate recovery from a sample, blank, or QC sample is less than 40% or more than 140%, check calculations to locate possible errors, check the fortifying standard solution for degradation, and check changes in instrument performance.

If the cause cannot be determined, reanalyze the sample unless one of the following exceptions applies:

- (1) Obvious interference is present on the chromatogram (e.g., unresolved complex mixture);
- (2) The surrogate exhibits high recovery and associated target analytes or hydrocarbon ranges are not detected in sample.

If a sample with a surrogate recovery outside of the acceptable range is not reanalyzed based on any of these aforementioned exceptions, this information must be noted on the data report form and discussed in the Executive Report. Analysis of the sample on dilution may diminish matrix-related surrogate recovery problems. This approach can be used as long as the reporting limits to evaluate applicable MCP standards can still be achieved with the dilution. If not, reanalysis without dilution must be performed.

| All criteria were met _X |
|--|
| Criteria were not met and/or see below |

VII. A MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples.

At the request of the data user, and in consideration of sample matrices and data quality objectives, matrix spikes and matrix duplicates may be analyzed with every batch of 20 samples or less per matrix.

- Matrix duplicate Matrix duplicates are prepared by analyzing one sample in duplicate. The purpose of the matrix duplicates is to determine the homogeneity of the sample matrix as well as analytical precision. The RPD of detected results in the matrix duplicate samples must not exceed 50 when the results are greater than 5x the reporting limit.
- The desired spiking level is 50% of the highest calibration standard. However, the total concentration in the MS (including the MS and native concentration in the unspiked sample) should not exceed 75% of the highest calibration standard in order for a proper evaluation to be performed. The purpose of the matrix spike is to determine whether the sample matrix contributes bias to the analytical results. The corrected concentrations of each analyte within the matrix spiking solution must be within 40 140% of the true value. Lower recoveries of n-nonane are permissible but must be noted in the narrative if <30%.</p>

| M9/M9D Recov | eries and Precision Cr | iteria | | | |
|---|------------------------|--------|--------------------------|-----------|--------|
| Sample ID:_FA41752-2_MS/MSD | | | Matrix/Level:Groundwater | | |
| . – | _ | | | _ | |
| List the %Rs, RPD of the compounds which do not meet the QC criteria. | | | | | |
| MS OR MSD | COMPOUND | % R | RPD | QC LIMITS | ACTION |
| | COMPOUND | 70 FX | RPD | QC EIMITS | ACTION |
| | | | | | 16 |
| | | | | 100 A | |
| <u> </u> | | | | | |
| | | | | | |
| STREET, STREET, | | | | | |
| | | | | | |

Note: MS/MSD % recovery and RPD within laboratory control limits.

| | | c | criteria wer | All criteria w e not met and/or s | vere metX see below |
|--|--|--|---|--|--|
| No action is taken informed profession conjunction with o data. In those insaffect only the sail However, it may be a systematic profassociated sample | onal judgment, ther QC criteria tances where it mple spiked, the edetermined throblem in the analysis. | he data and dete can be o qualifica ough the | reviewer r rmine the i determined tion should MS/MSD re | may use the MS need for some que that the results the limited to this sults that the lab | /MSD results in allification of the of the MS/MSD is sample alone. oratory is having |
| 2. MS/MSD - | Unspiked Comp | ounds | | | |
| List the concentrate compounds in the | | | | | |
| COMPOUND | CONCENTR. SAMPLE | ATION MS | MSD | %RPD | ACTION |
| · · · · · · · · · · · · · · · · · · · | | | | | Table 1 |
| | | | | 1000 | |
| | | | | 5 | |
| | 1 | | | | |
| | STATE OF THE PARTY | | | | |
| Marie Color | | | | | |
| Criteria: None spe | cified, use %RSD |) <u><</u> 50 as | profession | al judgment. | |

If the % RSD > 50, qualify the results in the spiked sample as estimate (J). If the % RSD is not calculable (NC) due to nondetect value in the sample, MS, and/or MSD, use professional judgment to qualify sample data.

A separate worksheet should be used for each MS/MSD pair.

| | All criteria were metX Criteria were not met and/or see below | | | | |
|--|---|--|--|--|--|
| VI | II. LABORATORY CONTROL SAMPLE (LCS/LCSD) ANALYSIS | | | | |
| Th matrices. | nis data is generated to determine accuracy of the analytical method for various | | | | |
| 1. | LCS Recoveries Criteria | | | | |
| | List the %R of compounds which do not meet the criteria | | | | |
| LCS ID | COMPOUND % R QC LIMIT ACTION | | | | |
| LCS/LC | CSD_RECOVERY_WITHIN_LABORATORY_CONTROL_LIMTS | | | | |
| | | | | | |
| 1.50 | | | | | |
| * | Criteria: * Refer to QAPP for specific criteria. * The spike recovery must be between 40% and 140%. Lower recoveries of n-nonane are permissible. If the recovery of n-nonane is <30%, note the nonconformance in the executive narrative. RPD between LCS/LCSD must be < 25%. | | | | |
| Ac tha | Actions: Actions on LCS recovery should be based on both the number of compounds that are outside the %R and RPD criteria and the magnitude of the excedance of the criteria. | | | | |
| the assoc If the %R for the aff If more th qualify all | of the analyte is > UL, qualify all positive results (j) for the affected analyte in iated samples and accept nondetects. of the analyte is < LL, qualify all positive results (j) and reject (R) nondetects ected analyte in the associated samples. an half the compounds in the LCS are not within the required recovery criteria, positive results as (J) and reject nondetects (R) for all target analyte(s) in the d samples. | | | | |
| 2. Fr | equency Criteria: | | | | |
| per matrix If no, the the effect | CS analyzed at the required frequency and for each matrix (1 per 20 samples c)? Yes or No. data may be affected. Use professional judgment to determine the severity of and qualify data accordingly. Discuss any actions below and list the samples Discuss the actions below: | | | | |
| - | | | | | |

| | | Criter | All crit ria were not met and/ | | ere met pelow _N/A |
|--|---|---|--|----------------------------------|---|
| IX. FIELD/LAE | 3ORATOR | Y DUPLICATE PR | ECISION | | |
| Sample IDs: | | | N | latrix: | - |
| overall precision. results may have laboratory perform | These ana e more va nance. It is er matrices | alyses measure bo riability than labo also expected tha | taken and analyzed oth field and lab pre- pratory duplicates w It soil duplicate result as associated with col | cision; t hich m is will h | therefore, the easures only ave a greater |
| COMPOUND | SQL | SAMPLE CONC. | DUPLICATE CONC. | RPD | ACTION |
| | | | | | |
| | | | data package. MS/M ry and generally acce | | |
| | | | | | |
| RPD ± 30% for aq | ueous sam | ples, RPD <u>+</u> 50 % | ct-specific informatio | esults a | are <u>></u> SQL. |
| If both samples and duplicate are <5 SQL, the RPD criteria is doubled. | | | | | |
| SQL = soil quantitation limit | | | | | |
| Actions: | | | | | |
| If both the samp calculable (NC). N | | | are nondetects (N | D), the | RPD is not |
| Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. | | | | | |

If one sample result is not detected and the other is $\geq 5x$ the SQL qualify (J/UJ).

Note: If SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is < 5x the SQL, use professional judgment to determine if qualification is appropriate.

| All criteria were met | X |
|--|---|
| Criteria were not met and/or see below | |

XI. COMPOUND IDENTIFICATION

The compound identification evaluation is to verify that the laboratory correctly identified target analytes as well as tentatively identified compounds (TICs).

- 1. Verify that the target analytes were within the retention time windows.
 - Retention time windows must be re-established for each Target EPH
 Analyte each time a new GC column is installed, and must be verified and/or adjusted on a daily basis.
 - o The n-nonane (n-C9) peak must be adequately resolved from the solvent front of the chromatographic run.
 - o All surrogates must be adequately resolved from the Aliphatic Hydrocarbon and Aromatic Hydrocarbon standards.
 - For the purposes of this method, adequate resolution is assumed to be achieved if the height of the valley between two peaks is less than 25% of the average height of the two peaks.
 - The n-pentane (C5) and MtBE peaks must be adequately resolved from any solvent front that may be present on the FID and PID chromatograms, respectively.
- 1a. Aliphatic hydrocarbons range:
 - o Determine the total area count for all peaks eluting 0.1 minutes before the retention time (Rt) for n-C9 and 0.01 minutes before the Rt for n-C19.
 - o Determine the total area count for all peaks eluting 0.01 minutes before the Rt for n-C19 and 0.1 minutes after the Rt for n-C36.

Are the aliphatic hydrocarbons range properly determined?

Yes? or No?

Comments:

- 1b. Aromatic hydrocarbons range:
 - Determine the total area count for all peaks eluting 0.1 minutes before the retention time (Rt) for naphthalene and 0.1 minutes after the Rt for benzo(g,h,i)perylene.
 - Determine the peak area count for the sample surrogate (OTP) and fractionation surrogate(s). Subtract these values from the collective area count value.

Are the aliphatic hydrocarbons range properly determined?

Yes? or No?

Comments::

Comments: Not applicable.

| | All criteria were metX Criteria were not met and/or see below |
|----|--|
| 2. | If target analytes and/or TICs were not correctly identified, request that the laboratory resubmit the corrected data. |
| 3. | Breakthrough determination - Each sample (field and QC sample) must be evaluated for potential breakthrough on a sample specific basis by evaluating the recovery of the fractionation surrogate (2-bromonaphthalene) and on a batch basis by quantifying naphthalene and 2-methylnaphthalene in both the aliphatic and aromatic fractions of the LCS and LCSD. If either the concentration of naphthalene or 2-methylnaphthalene in the aliphatic fraction exceeds 5% of the total concentration for naphthalene or 2-methylnaphthalene in the LCS or LCSD, fractionation must be repeated on all archived batch extracts. |
| | NOTE: The total concentration of naphthalene or 2 methylnaphthalene in the LCS/LCSD pair includes the summation of the concentration detected in the aliphatic fraction and the concentration detected in the aromatic fraction. |
| | Comments:Concentration_in_the_aliphatic_fraction_<_5%_of_the_totalconcentration_for_naphthalene_and_2-methylnaphthalene |
| | |
| 4. | Fractionation Check Standard – A fractionation check solution is prepared containing 14 alkanes and 17 PAHs at a nominal concentration of 200 ng/µl deach constituent. The Fractionation Check Solution must be used to evaluate the fractionation efficiency of each new lot of silica gel/cartridges, and establish the optimum hexane volume required to efficiently elute aliphatic hydrocarbons while not allowing significant aromatic hydrocarbon breakthrough. For each analytic contained in the fractionation check solution, excluding n-nonane, the Percent Recovery must be between 40 and 140%. A 30% Recovery is acceptable for monane. |
| | Is a fractionation check standard analyzed? Ves2 or No2 |

| | | Criteria were not | All criteria were metX met and/or see below | | |
|----------|--|--|--|--|--|
| XII. | QUANTITATION LIMI | TS AND SAMPLE RESULTS | | | |
| The sa | ample quantitation eval | uation is to verify laboratory qu | antitation results. | | |
| of C28 | | bsence of aliphatic mass disc st 0.85. If <0.85, this nonconfo | | | |
| | | nuing Calibration Standards for ovious signs of mass discrimina | | | |
| Is alipl | hatic mass discrimination | on observed in the sample? | Yes? or No? | | |
| ls aror | matic mass discrimination | on observed in the sample? | Yes? or No? | | |
| 1. | in the space below, pl | ease show a minimum of one | sample calculation: | | |
| | (C11 – C22, Aromatics) | | | | |
| | Computer printout | | | | |
| 2. | If requested, verify that the results were above the laboratory method detection limit (MDLs). | | | | |
| 3. | - | , were the SQLs elevated ac les and dilution factor in the ta | | | |
| | SAMPLE ID | DILUTION FACTOR | REASON FOR DILUTION | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | ion was not performed ed samples/compounds | , estimate results (J) for the a | affected compounds. List the | | |

EXECUTIVE NARRATIVE

SDG No:

FA41752

Laboratory:

Accutest, Orlando

12

Analysis:

SW846-8081B

Number of Samples:

Location:

BMSMC, Humacao, PR

SUMMARY:

Twelve (12) samples were analyzed for the TCL pesticides list following method SW846-8081B. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence *Hazardous Waste Support Section SOP No. HW-36A, Revision O, June, 2015. SOM02.2. Pesticide Data Validation.* The QC criteria and data validation actions listed on the data review worksheets are from the primary

guidance document, unless otherwise noted.

Results are valid and can be used for decision making purposes.

Critical issues:

None

Major:

None

Minor:

None

Critical findings:

None

Major findings:

None

Minor findings:

None

COMMENTS:

Results are valid and can be used for decision making purposes.

Reviewers Name:

Rafael Infante

Chemist License 1888

Signature:

April 18, 2017

Date:

ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA41752-1

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Equipment Blank

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

9600.0 Dieldrin

Sample ID: FA41752-2

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

0.0095

Sample ID: FA41752-3

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Field Blank Water

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

0.0095

Sample ID: FA41752-4

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 0.0095

Sample location: BMSMC, Humacao, PR Sample ID: FA41752-5

3/2/2017 Sampling date:

Matrix: AQ - Equipment Blank

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

0.010 Dieldrin

Sample ID: FA41752-6

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result **Analyte Name**

ug/L 0.0098 Dieldrin

Sample ID: FA41752-7

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 0.0095

Sample ID: FA41752-8

Sample location: BMSMC, Humacao, PR

Matrix: AQ - Field Blank Water 3/2/2017 Sampling date:

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

0.0096 Dieldrin

Sample ID: FA41752-9

Sample location: BMSMC, Humacao, PR

Matrix: Groundwater Sampling date: 3/2/2017

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ug/L 0.010 Dieldrin

Sample ID: FA41752-10

Sample location: BMSMC, Humacao, PR

3/2/2017 Sampling date:

Matrix: Groundwater

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result **Analyte Name**

0.010

Sample ID: FA41752-2MS (03/11/17) Sample location: BMSMC, Humacao, PR

Matrix: Groundwater Sampling date: 3/1/2017

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L 0.50

Sample ID: FA41752-2MSD (03/14/17)

Sample location: BMSMC, Humacao, PR 3/1/2017 Sampling date:

Matrix: Groundwater

METHOD: 8081B

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

| | Project/CasNumber:FA41752 Sampling Date:03/01-02/2017 Shipping Date:03/02/2017 EPA Region No.:2 |
|---|--|
| REVIEW OF PESTICIDE ORG | BANIC PACKAGE |
| The following guidelines for evaluating volatile organization actions. This document will assist the revenate more informed decision and in better serverample results were assessed according to USEPA the following order of precedence Hazardous Williams Of June, 2015. SOM02.2. Pesticide Data validation actions listed on the data review work document, unless otherwise noted. | viewer in using professional judgment to ving the needs of the data users. The A data validation guidance documents in Vaste Support Section SOP No. HW-36A Validation. The QC criteria and data |
| The hardcopied (laboratory name) _Accutesteviewed and the quality control and performance data summa | data package received has been arized. The data review for VOCs included: |
| Lab. Project/SDG No.:FA41752 No. of Samples:12 Frip blank No.: FA41752-3; FA41752-8 Equipment blank No.: FA41752-1; FA41752-5 Field duplicate No.: FA41752-2MS/-2MSD QC audit samples: | |
| X Data CompletenessX Holding TimesN/A GC/MS TuningX Internal Standard PerformanceX BlanksX Surrogate RecoveriesX Matrix Spike/Matrix Spike Duplicate Overall Comments:Dieldrin_by_SW846-8081B | X Laboratory Control SpikesX Field DuplicatesX CalibrationsX Compound IdentificationsX Compound QuantitationX Quantitation Limits |
| | |
| · · · · · · · · · · · · · · · · · · · | ound not detected ted nondetect |

DATA COMPLETENESS

| MISSING INFORMATION | DATE LAB. CONTACTED | DATE RECEIVED |
|---|---------------------|---------------|
| _ | | |
| | | |
| | | |
| | - 2 | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | A. | |
| | | |
| | | |
| *************************************** | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| 1 53.43 (7.53.37) | | 4 |
| | | |
| 77. %=== | | |
| | | |
| | | |
| | | |
| | | ¥ |
| | | |

| All criteria were met _ | X_ |
|-------------------------|----|
| Criteria were not met | |
| and/or see below | |

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

| SAMPLE ID | DATE | DATE | ACTION |
|----------------------|---------------------|-------------------------------|-----------------------------|
| | SAMPLED | EXTRACTED/ANALYZED | |
| Samples properly pre | eserved. All sample | es extracted and analyzed wit | thin the required criteria. |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

Note:

<u>Criteria</u>

Aqueous samples - seven (7) days from sample collection for extraction; 40 days from sample collection for analysis.

Non-aqueous samples – fourteen (14) days from sample collection for extraction; 40 days from sample collection for analysis.

Cooler temperature (Criteria: 4 ± 2 °C): 3.7-4.1 °C - OK

Actions

Qualify aqueous sample results using preservation and technical holding time information as follows:

- a. If there is no evidence that the samples were properly preserved ($T = 4^{\circ}C \pm 2^{\circ}C$), and the samples were extracted or analyzed within the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ).
- b. If there is no evidence that the samples were properly preserved (T = 4° C \pm 2° C), and the samples were extracted or analyzed outside the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ).
- c. If the samples were properly preserved, and were extracted and analyzed within the technical holding times, no qualification of the data is necessary.
- d. If the samples were properly preserved, and were extracted or analyzed outside the technical holding times, qualify detects as estimated (J) and non-detects as estimated (UJ). Note in the Data Review Narrative that holding times were exceeded and the effect of exceeding the holding time on the resulting data.

- e. Use professional judgment to qualify samples whose temperature upon receipt at the laboratory is either below 2 degrees centigrade or above 6 degrees centigrade.
- f. If technical holding times are grossly exceeded, use professional judgment to qualify the data.

Qualify non-aqueous sample results using preservation and technical holding time information as follows:

- a. If there is no evidence that the samples were properly preserved (T = 4° C \pm 2° C), and the samples were extracted or analyzed within the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ).
- b. If there is no evidence that the samples were properly preserved (T = 4° C \pm 2° C), and the samples were extracted or analyzed outside the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ).
- c. If the samples were properly preserved, and were extracted and analyzed within the technical holding time, no qualification of the data is necessary.
- d. If the samples were properly preserved, and were extracted or analyzed outside the technical holding time, qualify detects as estimated (J) and non-detects as estimated (UJ). Note in the Data Review Narrative that holding times were exceeded and the effect of exceeding the holding time on the resulting data.
- e. Use professional judgment to qualify samples whose temperature upon receipt at the laboratory is either below 2 degrees centigrade or above 6 degrees centigrade.
- f. If technical holding times are grossly exceeded, use professional judgment to qualify the data.

| All criteria were metX | _ |
|---------------------------------|---|
| Criteria were not met see below | |

GAS CHROMATOGRAPH WITH ELECTRON CAPTURE DETECTOR (GC/ECD) INSTRUMENT PERFORMANCE CHECK (SECTIONS 1 TO 5)

1. Resolution Check Mixture

Criteria

Is the resolution between two adjacent peaks in the Resolution Check Mixture C greater than or equal to 80.0% for all analytes for the primary column and greater than or equal to 50.0% for the confirmation column?

Yes? or No?

Is the resolution between two adjacent peaks in the Resolution Check Mixture (A and B) greater than or equal to 60.0%?

Yes? or No?

Note: If resolution criteria are not met, the quantitative results may not be accurate due to inadequate resolution. Qualitative identifications may also be questionable if coelution exists.

Action

- a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
- b. Qualify non-detected compounds as unusable (R).

2. Performance Evaluation Mixture (PEM) Resolution Criteria

Criteria

Is PEM analysis performed at the required frequency (at the end of each pesticide initial calibration sequence and every 12 hours)?

Yes? or No?

Action

a. If PEM is not performed at the required frequency, qualify all associated sample and blank results as unusable (R).

Criteria

Is PEM % Resolution < 90%?

Yes? or No?

Action

- a. a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
- b. Qualify non-detected compounds as unusable (R).

| | All cri | teria | ı we | re m | et | _X |
|----------|---------|-------|------|------|-------|----|
| Criteria | were | not | met | see | below | |

3. PEM 4,4'-DDT Breakdown

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is detected?

Yes? or No?

Action

a. Qualify detects for 4,4'-DDT; detects for 4,4'-DDD; and detects for 4,4'-DDE as estimated (J)

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is not detected

Yes? or No?

Action

- a. Qualify non-detects for 4,4'- DDT as unusable (R)
- b. Qualify detects for 4,4'-DDD as tentatively identified (NJ)
- c. Qualify detects for 4,4'-DDE as tentatively identified (NJ)

4. PEM Endrin Breakdown

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is detected?

Yes? or No?

Action

a. Qualify detects for Endrin; detects for Endrin aldehyde; and detects for Endrin ketone as estimated (J)

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is not detected

Yes? or No?

Action

- a. Qualify non-detects for Endrin as unusable (R)
- b. Qualify detects for Endrin aldehyde as tentatively identified (NJ)
- c. Qualify detects for Endrin ketone as tentatively identified (NJ)

| All criteria were metX | |
|---------------------------------|--|
| Criteria were not met see below | |

5. Mid-point Individual Standard Mixture Resolution -

Criteria

Is the resolution between two adjacent peaks in the Resolution Check Mixture C greater than or equal to 80.0% for all analytes for the primary column and greater than or equal to 50.0% for the confirmation column?

Yes? or No?

Is the resolution between two adjacent peaks in the Resolution Check Mixture (A and B) greater than or equal to 90.0%?

Yes? or No?

Note: If resolution criteria are not met, the quantitative results may not be accurate due to inadequate resolution. Qualitative identifications may also be questionable if coelution exists.

Action

- a. Qualify detects for target compounds that were not adequately resolved as tentatively identified (NJ).
- b. Qualify non-detected compounds as unusable (R).

Criteria

Is mid-point individual standard mixture analysis performed at the required frequency (every 12 hours)? Yes? or No?

Action

a. If the mid-point individual standard mixture analysis is not performed at the required frequency, qualify all associated sample and blank results as unusable (R).

| All criteria were metX | |
|------------------------|--|
| Criteria were not met | |
| and/or see below | |

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

| Date of initial calibration: | 03/10/17 |
|---|-------------|
| Dates of initial calibration verification:_ | 03/10/17 |
| Dates of continuing calibration: | 03/11/17 |
| Dates of final calibration | 03/11/17 |
| Instrument ID numbers: | ECD_6 |
| Matrix/Level: | Aqueous/low |

| DATE | LAB ID# | FILE | CRITERIA OUT RFs, %RSD, %D, r | COMPOUND | SAMPLES AFFECTED |
|------|------------|------|----------------------------------|----------|------------------|
| | | | | | |

Note: Initial and initial calibration verification within the guidance document performance criteria. Continuing calibration % differences meet the performance criteria in the two columns.

Final calibration verification included in data package.

Criteria

Are a five point calibration curve delivered with concentration levels as shown in Table 3 of SOP HW-36A, Revision 0, June, 2015?

Yes? or No?

Actions

If the standard concentrations listed in Table 3 are not used, use professional judgment to evaluate the effect on the data

Criteria

Are RT Windows calculated correctly?

Yes? or No?

Action

Recalculate the windows and use the corrected values for all evaluations.

Criteria

Are the Percent Relative Standard Deviation (%RSD) of the CFs for each of the single component target compounds less than or equal to 20.0%, except for alpha-BHC and delta-BHC?

Yes? or No?

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

Are the %RSD of the CFs for alpha-BHC and delta-BHC less than or equal to 25.0%. Yes? or No?

Is the %RSD of the CFs for each of the Toxaphene peaks must be < 30% when 5-point ICAL is performed?

Yes? or No?

Is the %RSD of the CFs for the two surrogates (tetrachloro-m-xylene and decachlorobiphenyl) less than or equal to 30.0%.

Yes? or No?

Action

- a. If the %RSD criteria are not met, qualify detects as estimated (J) and use professional judgment to qualify non-detected target compounds.
- b. If the %RSD criteria are within allowable limits, no qualification of the data is necessary

Continuing Calibration Checks

Criteria

Is the continuing calibration standard analyzed at the acceptable time intervals? Yes? or No?

Action

- a. If more than 14 hours has elapsed from the injection of the instrument blank that begins an analytical sequence (opening CCV) and the injection of either a PEM or mid-point concentration of the Individual Standard Mixtures (A and B) or (C), qualify all data as unusable (R).
- b. If more than 12 hours has elapsed from the injection of the instrument blank that begins an analytical sequence (opening CCV) and the injection of the last sample or blank that is part of the same analytical sequence, qualify all data as unusable (R).
- c. If more than 72 hours has elapsed from the injection of the sample with a Toxaphene detection and the Toxaphene Calibration Verification Standard (CS3), qualify all data as unusable (R).

Criteria

Is the Percent Difference (%D) within ±25.0% for the PEM sample?

Yes? or No?

Action

a. Qualify associated detects as estimated (J) and non-detects as estimated (UJ).

Criteria

For the Calibration Verification Standard (CS3); is the Percent Difference (%D) within ± 25.0%? Yes? or No?

Action

Qualify associated detects as estimated (J) and non-detects as estimated (UJ).

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is detected?

Yes? or No?

Action

- a. Qualify detects for 4,4'-DDT; detects for 4,4'-DDD; and detects for 4,4'-DDE as estimated (J)
- b. Non-detected associated compounds are not qualified

Criteria

Is the PEM 4,4'-DDT % Breakdown >20.0% and 4,4'-DDT is not detected

Yes? or No?

Action

- a. Qualify non-detects for 4,4'- DDT as unusable (R)
- b. Qualify detects for 4,4'-DDD as tentatively identified (NJ)
- c. Qualify detects for 4,4'-DDE as tentatively identified (NJ)

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is detected?

Yes? or No?

Action

- a. Qualify detects for Endrin; detects for Endrin aldehyde; and detects for Endrin ketone as estimated (J)
- b. Non-detected associated compounds are not qualified

Criteria

Is the PEM Endrin % Breakdown >20.0% and Endrin is not detected

Yes? or No?

Action

- a. Qualify non-detects for Endrin as unusable (R)
- b. Qualify detects for Endrin aldehyde as tentatively identified (NJ)
- c. Qualify detects for Endrin ketone as tentatively identified (NJ)

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

| List the contamin | adon in the bia | into bolow. The | | |
|--------------------------------------|-----------------------|---------------------------|-----------------------|------------------------------------|
| CRQL concentrate | tionN/ | A | <u> </u> | |
| Laboratory blanks | s | | | |
| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS |
| _ug/L | | | | nit_of_0.01,_0.04,_and_0.25_ |
| Field/Equipment | t/Trin blank | | | |
| r lolar Equipment | <u>ה</u> וווף טומווג | | | |
| DATE | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS |
| DATE ANALYZED | LAB ID | MATRIX | | |
| DATE ANALYZED _No_target_analy | LAB ID ytes_detected_ | MATRIX in_the_field/eq | uipment_blanks_analyz | UNITS |
| DATE ANALYZED _No_target_analy | LAB ID ytes_detected_ | MATRIX in_the_field/eq | uipment_blanks_analyz | UNITS red_with_this_data_package. |
| DATE ANALYZED _No_target_analy | LAB ID ytes_detected_ | MATRIX in_the_field/eq | uipment_blanks_analyz | UNITS red_with_this_data_package. |
| DATE ANALYZED _No_target_analy | LAB ID ytes_detected_ | MATRIX in_the_field/eq | uipment_blanks_analyz | UNITS red_with_this_data_package. |

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

The concentration of non-target compounds in all blanks must be less than or equal to $10 \mu g/L$. The concentration of each target compound found in the method or field blanks must be less than its CRQL listed in the method.

Data concerning the field blanks are not evaluated as part of the CCS process. If field blanks are present, the data reviewer should evaluate this data in a similar fashion as the method blanks.

Specific actions are as follows:

Blank Actions for Pesticide Analyses

| Blank Type | Blank Result | Sample Result | Action for Samples |
|--------------------|---------------------|--------------------|-----------------------------|
| | Detects | Not detected | No qualification required |
| | < CRQL | < CRQL | Report CRQL value with a U |
| | | ≥ CRQL | No qualification required |
| Method, Sulfur | | < CRQL | Report CRQL value with a U |
| Cleanup, | | ≥ CRQL and ≤ blank | Report blank value for |
| Instrument, Field, | > CRQL | concentration | sample concentration with a |
| TCLP/SPLP | - Char | | U |
| | | ≥ CRQL and > blank | No qualification required |
| | | concentration | |
| | = CRQL | ≤CRQL | Report CRQL value with a U |
| | | > CRQL | No qualification required |
| | Gross contamination | Detects | Report blank value for |
| | | | sample concentration with a |
| | <u></u> | | U |

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

| CONTAMINATION SOURCE/LEVEL | COMPOUND | CONC/UNITS | AL/UNITS | SQL | AFFECTED SAMPLES |
|----------------------------|----------|--|----------|-----|------------------|
| 43 | | | | | |
| - | | | | | |
| | | | | | |
| | | A COLUMN TO A COLU | | | |
| | | | | | |
| | 4 | | | | |
| | | | | - 4 | |
| | | | | | 1 |
| | | | | | |
| | | | | | 38 1/74" |

| All criteria were metX | |
|------------------------|--|
| Criteria were not met | |
| and/or see below | |

SURROGATE SPIKE RECOVERIES

Laboratory performance of individual samples is established by evaluation of surrogate spike recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

List the percent recoveries (%Rs) which do not meet the criteria for surrogate recovery.

| Matrix:_Aqueous/Solid_ | | | |
|------------------------|------------|------|------|
| Lab | Lab | | |
| Sample ID | File ID | S1 a | S2 a |
| FA41752-1 | TT381283.D | 80 | 27 |
| FA41752-2 | TT381284.D | 86 | 92 |
| FA41752-3 | TT381289.D | 81 | 60 |
| FA41752-4 | TT381290.D | 87 | 99 |
| FA41752-5 | TT381291.D | 72 | 34 |
| FA41752-6 | TT381292.D | 85 | 92 |
| FA41752-7 | TT381293.D | 101 | 110 |
| FA41752-8 | TT381294.D | 88 | 56 |
| FA41752-9 | TT381295.D | 86 | 96 |
| FA41752-10 | TT381296.D | 90 | 86 |
| OP64048-BS | TT381277.D | 85 | 97 |
| OP64048-BS2 | TT381278.D | 81 | 92 |
| OP64048-MB | TT381279.D | 84 | 94 |
| OP64048-MS | TT381285.D | 84 | 102 |
| OP64048-MSD | TT381286.D | 90 | 106 |

Surrogate Compounds

Recovery Limits (Aqueous)

S1 = Tetrachloro-m-xylene S2 = Decachlorobiphenyl 42-127%

27-127%

(a) Recovery from GC signal #1

Note: Surrogate recoveries were within laboratory control limits.

Actions:

- a. For any surrogate recovery greater than 150%, qualify detected target compounds as biased high (J+).
- b. Do not qualify non-detected target compounds for surrogate recovery > 150 %.
- c. If both surrogate recoveries are greater than or equal to 30% and less than or equal to 150%, no qualification of the data is necessary.

- d. For any surrogate recovery greater than or equal to 10% and less than 30%, qualify detected target compounds as biased low (J-).
- e. For any surrogate recovery greater than or equal to 10% and less than 30%, qualify non-detected target compounds as approximated (UJ).
- f. If low surrogate recoveries are from sample dilution, professional judgment should be used to determine if the resulting data should be qualified. If sample dilution is not a factor:
 - i. Qualify detected target compounds as biased low (J-).
 - ii. Qualify non-detected target compounds as unusable (R).
- g. If surrogate RTs in PEMs, Individual Standard Mixtures, samples, and blanks are outside of the RT Windows, the reviewer must use professional judgment to qualify data.
- h. If surrogate RTs are within RT windows, no qualification of the data is necessary.
- i. If the two surrogates were not added to all samples, MS/MSDs, standards, LCSs, and blanks, use professional judgment in qualifying data as missing surrogate analyte may not directly apply to target analytes.

Summary Surrogate Actions for Pesticide Analyses

| | Action* | | |
|---|---------------------------|---------------------|--|
| Criteria | Detected Target | Non-detected Target | |
| | Compounds | Compounds | |
| %R > 150% | J+ | No qualification | |
| 30% < %R < 150% | No qualification | | |
| 10% < %R < 30% | J- | UJ | |
| %R < 10% (sample dilution not a factor) | J- | R | |
| %R < 10% (sample dilution is a factor) | Use professional judgment | | |
| RT out of RT window | Use profession | onal judgment | |
| RT within RT window | No qua | ification | |

* Use professional judgment in qualifying data, as surrogate recovery problems may not directly apply to target analytes.

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

MS/MSD Recoveries and Precision Criteria

Data for MS and MSDs will not be present unless requested by the Region. Notify the Contract Laboratory Program Project Officer (CLP PO) if a field blank was used for the MS and MSD, unless designated as such by the Region.

NOTE: For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID:____FA41752-2MS/2MSD___ Matrix/Level: Groundwater____ The QC reported here applies to the following samples: Method: SW846 8081B FA41752-1, FA41752-2, FA41752-3, FA41752-4, FA41752-5, FA41752-6, FA41752-7, FA41752-8 FA41752-9, FA41752-10 MS MS MSD MSD Spike Spike Limits Compound ug/l Q ug/l ug/l % ug/l ug/l % **RPD** Rec/RPD

Note: MS/MSD % recoveries and RPD within laboratory control limits.

Action

No qualification of the data is necessary on MS and MSD data alone. However, using professional judgment, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

A separate worksheet should be used for each MS/MSD pair.

| All criteria were met_ | х_ |
|------------------------|----|
| Criteria were not met | |
| and/or see below | |

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

1. LCS Recoveries Criteria

| LCS Spike Compound | Recovery Limits (%) |
|----------------------------------|---------------------|
| gamma-BHC | 50 – 120 |
| Heptachlor epoxide | 50 – 150 |
| Dieldrin | 30 – 130 |
| 4,4'-DDE | 50 – 150 |
| Endrin | 50 – 120 |
| Endosulfan sulfate | 50 – 120 |
| trans-Chlordane | 30 – 130 |
| Tetrachloro-m-xylene (surrogate) | 30 – 150 |
| Decachlorobiphenyl (surrogate) | 30 – 150 |

| LC | S concentrations | :1.0_ug/l | | |
|-------------|------------------|-------------------------------|----------------|----------|
| List the %F | R of compounds w | hich do not meet the criteria | 1 | |
| | LCS ID | COMPOUND | % R | QC LIMIT |
| | %_recovery_a | nd_RPD_within_laboratory_ | control_limits | |
| | | 120 | | |
| | | | | |
| No | ote: | | | |

Action

The following guidance is suggested for qualifying sample data for which the associated LCS does not meet the required criteria.

- a. If the LCS recovery exceeds the upper acceptance limit, qualify detected target compounds as estimated (J). Do not qualify non-detected target compounds.
- b. If the LCS recovery is less than the lower acceptance limit, qualify detected target compounds as estimated (J) and non-detects as unusable (R).
- c. Use professional judgment to qualify data for compounds other than those compounds that are included in the LCS.
- d. Use professional judgment to qualify non-LCS compounds. Take into account the compound class, compound recovery efficiency, analytical problems associated with each compound, and comparability in the performance of the LCS compound to the non-LCS compound.
- e. If the LCS recovery is within allowable limits, no qualification of the data is necessary.

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? <u>Yes</u> or No. If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

| All criteria were met |
|-----------------------|
| Criteria were not met |
| and/or see belowN/A |

FLORISIL CARTRIDGE PERFORMANCE CHECK

NOTE: Florisil cartridge cleanup is mandatory for all extracts.

Criteria

Is the Florisil cartridge performance check conducted at least once on each lot of cartridges used for sample cleanup or every 6 months, whichever is most frequent? Yes? or No? N/A

Criteria

Are the results for the Florisil Cartridge Performance Check solution included with the data package?

Yes? or No? N/A

Note: If % criteria are not met, examine the raw data for the presence of polar interferences and use professional judgment in qualifying the data as follows:

Action:

- a. If the Percent Recovery is greater than 120% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected compounds as estimated (J). Do not qualify non-detected target compounds.
- b. If the Percent Recovery is greater than or equal to 80% and less than or equal to 120% for all the pesticide target compounds, no qualification of the data is necessary.
- c. If the Percent Recovery is greater than or equal to 10% and less than 80% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected target compounds as estimated (J) and non-detected target compounds as approximated (UJ).
- d. If the Percent Recovery is less than 10% for any of the pesticide target compounds in the Florisil Cartridge Performance Check, qualify detected compounds as estimated (J) and qualify non-detected target compounds as unusable (R).
- e. If the Percent Recovery of 2,4,5-trichlorophenol in the Florisil Cartridge Performance Check is greater than or equal to 5%, use professional judgment to qualify detected and non-detected target compounds, considering interference on the sample chromatogram.

Note: State in the Data Review Narrative potential effects on the sample data resulting from the Florisil Cartridge Performance Check analysis not yielding acceptable results.

Note: No information for Florisil cartridge performance check included in data package.

| All criteria were met | _ |
|-----------------------|---|
| Criteria were not met | |
| and/or see below | |

GEL PERMEATION CHROMATOGRAPHY (GPC) PERFORMANCE CHECK

NOTE: GPC cleanup is mandatory for all soil samples.

If GPC criteria are not met, examine the raw data for the presence of high molecular weight contaminants; examine subsequent sample data for unusual peaks; and use professional judgment in qualifying the data. Notify the Contract Laboratory Program Project Officer (CLP PO) if the laboratory chooses to analyze samples under unacceptable GPC criteria.

Action:

- a. If the Percent Recovery is less than 10% for the pesticide compounds and surrogates during the GPC calibration check, the non-detected target compounds may be suspect, qualify detected compounds as estimated (J).
- b. If the Percent Recovery is less than 10% for the pesticide compounds and surrogates during the GPC calibration check, qualify all non-detected target compounds as unusable (R).
- c. If the Percent Recovery is greater than or equal to 10% and is less than 80% for any of the pesticide target compounds in the GPC calibration, qualify detected target compounds as estimated (J) and non-detected target compounds as approximated (UJ).
- d. If the Percent Recovery is greater than or equal to 80% and less than or equal to 120% for all the pesticide target compounds, no qualification of the data is necessary.
- e. If high recoveries (i.e., greater than 120%) were obtained for the pesticides and surrogates during the GPC calibration check, qualify detected compounds as estimated (J). Do not qualify non-detected target compounds.

Note: State in the Data Review Narrative potential effects on the sample data resulting from the GPC cleanup analyses not yielding acceptable results.

Note: No information for performance of GPC cleanup included in data package.

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

TARGET COMPOUND IDENTIFICATION

Criteria:

- 1. Is Retention Times (RTs) of both of the surrogates and reported target compounds in each sample within the calculated RT Windows on both columns?

 Yes? or No?
- 2. Is the Tetrachloro-m-xylene (TCX) RT ± 0.05 minutes of the Mean RT (RT) determined from the initial calibration and Decachlorobiphenyl (DCB) within ± 0.10 minutes of the RT determined from the initial calibration? Yes? or No?
- 3. Is the Percent Difference (%D) for the detected mean concentrations of a pesticide target compound between the two Gas Chromatograph (GC) columns within the inclusive range of ± 25.0 %?

 Yes? or No?
- 4. When no analytes are identified in a sample; are the chromatograms from the analyses of the sample extract and the low-point standard of the initial calibration associated with those analyses on the same scaling factor?

 Yes? or No?
- 5. Does the chromatograms display the Single Component Pesticides (SCPs) detected in the sample and the largest peak of any multi-component analyte detected in the sample at less than full scale.

 Yes? or No?
- 6. If an extract is diluted; does the chromatogram display SCPs peaks between 10-100% of full scale, and multi-component analytes between 25-100% of full scale? Yes? or No? N/A
- 7. For any sample; does the baseline of the chromatogram return to below 50% of full scale before the elution time of alpha-BHC, and also return to below 25% of full scale after the elution time of alpha-BHC and before the elution time of DCB?

 Yes? or No?
- 8. If a chromatogram is replotted electronically to meet these requirements; is the scaling factor used displayed on the chromatogram, and both the initial chromatogram and the replotted chromatogram submitted in the data package.

 Yes? or No?

Action:

- a. If the qualitative criteria for both columns were not met, all target compounds that are reported as detected should be considered non-detected.
- b. Use professional judgment to assign an appropriate quantitation limit using the following guidance:
 - If the detected target compound peak was sufficiently outside the pesticide RT Window, the reported values may be a false positive and should be replaced with the sample Contract Required Quantitation Limits (CRQL) value.

- ii. If the detected target compound peak poses an interference with potential detection of another target peak, the reported value should be considered and qualified as unusable (R).
- c. If the data reviewer identifies a peak in both GC column analyses that falls within the appropriate RT Windows, but was reported as a non-detect, the compound may be a false negative. Use professional judgment to decide if the compound should be included.

Note: State in the Data Review Narrative all conclusions made regarding target compound identification.

- d. If the Toxaphene peak RT windows determined from the calibration overlap with SCPs or chromatographic interferences, use professional judgment to qualify the data.
- e. If target compounds were detected on both GC columns, and the Percent Difference between the two results is greater than 25.0%, consider the potential for coelution and use professional judgment to decide whether a much larger concentration obtained on one column versus the other indicates the presence of an interfering compound. If an interfering compound is indicated, use professional judgment to determine how best to report, and if necessary, qualify the data according to these guidelines.
- f. If Toxaphene exhibits a marginal pattern-matching quality, use professional judgment to establish whether the differences are due to environmental "weathering" (i.e., degradation of the earlier eluting peaks relative to the later eluting peaks). If the presence of Toxaphene is strongly suggested, report results as presumptively present (N).

GAS CHROMATOGRAPH/MASS SPECTROMETER (GC/MS) CONFIRMATION

NOTE: This confirmation is not usually provided by the laboratory. In cases where it is provided, use professional judgment to determine if data qualified with "C" can be salvaged if it was previously qualified as unusable (R).

Action:

- a. If the quantitative criteria for both columns were met (\geq 5.0 ng/µL for SCPs and \geq 125 ng/µL for Toxaphene), determine whether GC/MS confirmation was performed. If it was performed, qualify the data using the following guidance:
 - If GC/MS confirmation was not required because the quantitative criteria for both columns was not met, but it was still performed, use professional judgment when evaluating the data to decide whether the detect should be qualified with "C".
 - ii. If GC/MS confirmation was performed, but unsuccessful for a target compound detected by GC/ECD analysis, qualify those detects as "X".

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

COMPOUND QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

FA41752-2MS

Dieldrin

 $RF = 6.115 \times 10^4$

[] =

(3069290)/(6.115 X 10⁴)

= 50.19 ppb

Ok

Note:

Action:

- a. If sample quantitation is different from the reported value, qualify result as unusable (R).
- b. When a sample is analyzed at more than one dilution, the lowest CRQLs are used unless a QC exceedance dictates the use of the higher CRQLs from the diluted sample.
- c. Replace concentrations that exceed the calibration range in the original analysis by crossing out the "E" and its corresponding value on the original reporting form and substituting the data from the diluted sample.
- d. Results between the MDL and CRQL should be qualified as estimated (J).
- e. Results less than the MDL should be reported at the CRQL and qualified (U). MDLs themselves are not reported.
- f. For non-aqueous samples, if the percent moisture is less than 70.0%, no qualification of the data is necessary. If the percent moisture is greater than or equal to 70.0% and less than 90.0%, qualify detects as estimated (J) and non-detects as approximated (UJ). If the percent moisture is greater than or equal to 90.0%, qualify detects as estimated (J) and non-detects as unusable (R) (see Table).

Percent Moisture Actions for Pesticide Analysis for Non-Aqueous Samples

| Criteria | Action | |
|--------------------------|-------------------------------|-----------------------------------|
| | Detected Associated Compounds | Non-detected Associated Compounds |
| % Moisture < 70.0 | | lo qualification |
| 70.0 < % Moisture < 90.0 | J | UJ |
| % Moisture > 90.0 | J | R |

| | | | - |
|------|-----------------|-----|---|
| | | | |
| | | 100 | |
| | and the same of | - | |

Note: If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.

Dilution performed

| SAMPLE ID | DILUTION FACTOR | REASON FOR DILUTION |
|-----------|-----------------|---------------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | - 20 | b |
| | | |
| | - | |
| | | |
| 3.2 | 4 | |
| | | |
| | | |
| | | |
| | | |
| - | | |

| All criteria were met |
|-----------------------|
| Criteria were not met |
| and/or see belowN/A |

FIELD DUPLICATE PRECISION

NOTE: In the absence of QAPP guidance for validating data from field duplicates, the following action will be taken.

Field duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples. Identify which samples within the data package are field duplicates. Estimate the relative percent difference (RPD) between the values for each compound. If large RPDs (> 50%) is observed, confirm identification of samples and note difference in the executive summary.

| Sample IDs: | | | | Matrix: | | |
|--|-------------|-----------------|-----------------|---------|--------|--|
| COMPOUND | SQL ug/L | SAMPLE CONC. | DUPLICATE CONC. | RPD | ACTION | |
| | | | | | | |
| | | | | | | |
| No field/laboratory duplicate analyzed with this data package. MS/MSD % recovery RPD used to assess precision. RPD within the required criteria of < 50 %. | | | | | | |
| | | | | | | |
| | | | | | | |

Actions:

- a. Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.
- b. If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions apply:
 - i. If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).
 - ii. If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.
 - iii. If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.
 - iv. If both sample and duplicate results are not detected, no action is needed.

OVERALL ASSESSMENT OF DATA Action:

- 1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
- 2. Write a brief narrative to give the user an indication of the analytical limitations of the data.

Note: The Contract Laboratory Program Project Officer (CLP PO) must be informed if any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

Overall assessment of the data: Results are valid; the data can be used for decision

making purposes.

EXECUTIVE NARRATIVE

SDG No: FA41752 Laboratory: Accutest, Florida

Analysis: SW846-8260C Number of Samples: 12

Location: BMSMC – Humacao, PR

SUMMARY: Twelve (12) samples were analyzed for selected volatile organic compounds

(Hexachlorobutadiene from the VOA Special List) by method SW846-8260C. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: USEPA Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation. July, 2015. The QC criteria and data validation actions listed on the data review worksheets are from the

primary guidance document, unless otherwise noted.

Critical issues: None Major: None Minor: None

Critical findings: None Major findings: None

Minor findings: 1. No target analytes detected in the method blank except for the cases described in the

Data Review Worksheet. Hexachlorobutadiene was detected in sample FA41752-6 below the reporting limit. Results for haxachlorobutadiene in sample FA41752-6 reported as non-detected (U) at the reporting limit. Hexachlorobutadiene not detected in the other program

samples. No qualification performed.

COMMENTS: Results are valid and can be used for decision making purposes.

Reviewers Name: Rafael Infante

Chemist License 1888

Signature: Rafael Son Parest

Date: June 22, 2017

ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA41752-1

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017 Matrix: AQ - Equipment Blank

METHOD: 8260C

| Analyte Name | Result | Units Dil | ution Factor | Lab Flag | Validation | Reportable | |
|-------------------------|--------|-----------|--------------|----------|------------|--------------------|--|
| Benzene | 1.0 | ng/L | 1.0 | • | D | Yes | |
| Chloroform | 1.0 | ng/L | 1.0 | 1 | ⊃ | Yes | |
| Dichlorodifluoromethane | 2.0 | ng/L | 1.0 | ı | D | Yes | |
| 1,2-Dichloroethane | 1.0 | ng/L | 1.0 | 1 | n | Yes | |
| Methyl Tert Butyl Ether | 1.0 | ng/L | 1.0 | , | ח | Yes | |
| Tert-Amyl Alcohol | 20 | ug/L | 1.0 | 1 | ם | Yes | |
| Vinyl chloride | 1.0 | ug/L | 1.0 | ı | Ω |) ug/L 1.0 - U Yes | |

Sample ID: FA41752-2

Sample location: BMSMC, Humacao, PR Sampling date: 3/1/2017 Matrix: Groundwater

| Analyte Name | Result | Units Dilu | ition Factor | Lab Flag | Lab Flag Validation | Reportable |
|-------------------------|--------|------------|--------------|----------|---------------------|------------|
| Benzene | 1.0 | ng/L | 1.0 | • | ⊋ | Yes |
| Chloroform | 1.0 | ng/L | 1.0 | ı | J | Yes |
| Dichlorodifluoromethane | 2.0 | ng/L | 1.0 | , | ⊃ | Yes |
| 1,2-Dichloroethane | 1.0 | ng/L | 1.0 | c | ⊃ | Yes |
| Methyl Tert Butyl Ether | 1.0 | ng/L | 1.0 | • | n | Yes |
| Tert-Amyl Alcohol | 20 | ng/L | 1.0 | í | n | Yes |
| Vinyl chloride | 1.0 | ng/L | ug/L 1.0 | • | O | Yes |

Sample ID: FA41752-3

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Field Blank Water

METHOD: 8260C

| Analyte Name | | Units Dil | Units Dilution Factor Lab Flag Validation Re | Lab Flag | Validation | Reportable |
|-------------------------|-----|-----------|--|----------|------------|------------|
| Benzene | | ng/L | 1.0 | 1 | D | Yes |
| Chloroform | 1.0 | ng/L | 1.0 | ı |) | Yes |
| Dichlorodifluoromethane | | 1/8n | 1.0 | ı | o | Yes |
| 1,2-Dichloroethane | | ug/L | 1.0 | • |) | Yes |
| Methyl Tert Butyl Ether | | ng/L | 1.0 | • | 5 | Yes |
| Tert-Amyl Alcohol | | ng/L | 1.0 | 1 | _ | Yes |
| Vinyl chloride | | ng/L | 1.0 | 1 | D | Yes |

Sample ID: FA41752-4

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

| Analyte Name | | Units Dilu | ition Factor | Lab Flag | Validation | Reportable |
|-------------------------|-----|------------|--------------|----------|------------|------------|
| Benzene | | ng/L | 1.0 | | n | Yes |
| Chloroform | | ng/L | 1.0 | 1 | ⊃ | Yes |
| Dichlorodifluoromethane | | ng/L | 1.0 | ı | ⊃ | Yes |
| 1,2-Dichloroethane | | ng/L | 1.0 | | D | Yes |
| Methyl Tert Butyl Ether | | ng/L | 1.0 | 1 | ⊃ | Yes |
| Tert-Amyl Alcohol | | ng/L | 1.0 | | D | Yes |
| Vinyl chloride | 1.0 | ng/L | ug/L 1.0 - U | 1 | ⊃ | Yes |

Sample ID: FA41752-5

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017 Matrix: AQ - Equipment Blank

METHOD: 8260C

| Analyte Name | Result | Units Di | lution Factor | Lab Flag | Validation | Reportable |
|-------------------------|--------|----------|---------------|----------|------------|------------------|
| Benzene | 1.0 | ng/L | 1.0 | 1 | n | Yes |
| Chloroform | 1.0 | ng/L | 1.0 | • | ⊃ | Yes |
| Dichlorodifluoromethane | 2.0 | ng/L | 1.0 | | D | Yes |
| 1,2-Dichloroethane | 1.0 | ng/L | 1.0 | e | ⊃ | Yes |
| Methyl Tert Butyl Ether | 1.0 | ng/L | 1.0 | 31 | D | Yes |
| Tert-Amyl Alcohol | 20 | ng/L | 1.0 | 1 | ⊃ | Yes |
| Vinyl chloride | 1.0 | ng/L | 1.0 | • | n | ug/L 1.0 - U yes |

Sample ID: FA41752-6

Sample location: BMSMC, Humacao, PR Sampling date: 3/2/2017 Matrix: Groundwater

| Analyte Name | Result | Units Dil | its Dilution Factor Lab Flag Validation Reportabl | Lab Flag | Validation | Reportable |
|--------------------------------|--------|-----------|---|----------|------------|------------|
| Benzene | 1.0 | ng/L | 1.0 | • | ⊃ | Yes |
| Chloroform | 1.0 | ng/L | 1.0 | • | ⊃ | Yes |
| Dichlorodifluoromethane | 2.0 | ug/L | 1.0 | Œ | ⊃ | Yes |
| L,2-Dichloroethane | 1.0 | ng/L | 1.0 | 1 | n | Yes |
| Methyl Tert Butyl Ether | 1.0 | ng/L | 1.0 | 1 | n | Yes |
| Fert-Amyi Alcohol | 20 | ng/L | 1.0 | 9 |) | Yes |
| /inyl chloride | 1.0 | ng/L | 1.0 | • | ⊃ | Yes |

Sample ID: FA41752-7

Sample location: BMSMC, Humacao, PR Sampling date: 3/2/2017 Matrix: Groundwater

METHOD: 8260C

| Analyte Name | Result | Units D | ilution Factor | Lab Flag | Validation | Reportable |
|-------------------------|--------|---------|---------------------|----------|------------|------------|
| Benzene | 1.0 | ng/L | 1.0 | , | n | Yes |
| Chloroform | 1.0 | ng/L | 1.0 | 1 | ⊃ | Yes |
| Dichlorodifluoromethane | 2.0 | ng/L | 1.0 | , | D | Yes |
| 1,2-Dichloroethane | 1.0 | 1/8n | 1.0 | • | > | Yes |
| Methyl Tert Butyl Ether | 1.0 | ng/L | 1.0 | • |) | Yes |
| Tert-Amyl Alcohol | 20 | ug/L | 1.0 | 1 | ⊃ | Yes |
| Vinyl chloride | 1.0 | ng/L | .0 ug/L 1.0 - U yes | , | n | Yes |

Sample ID: FA41752-8

Sample location: BMSMC, Humacao, PR Sampling date: 3/2/2017 Matrix: AQ - Field Blank

| Anaiyte Name | Result | Units Dilu | tion Factor | Lab Flag | Validation | Reportable |
|-------------------------|--------|--------------|-------------|----------|------------|------------|
| Benzene | 1.0 | ng/L | 1.0 | • | b | Yes |
| Chloroform | 1.0 | ng/L | 1.0 | 1 | ⊃ | |
| Dichlorodifluoromethane | 2.0 | 1/8n | 1.0 | ı | n | |
| 1,2-Dichloroethane | 1.0 | ng/L | 1.0 | э | n | |
| Methyl Tert Butyl Ether | 1.0 | ng/L | 1.0 | • | ם | |
| Tert-Amyl Alcohol | 20 | ng/L | 1.0 | ı | ם | |
| Vinyl chloride | 1.0 | ug/t 1.0 - U | 1.0 | | n | Yes |

Sample ID: FA41752-9

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8260C

| Analyte Name | Result | Units Di | lution Factor | Lab Flag | Validation | Reportable | |
|-------------------------|--------|----------|---------------|----------|------------|------------------|--|
| Benzene | 1.0 | ug/Ł | 1.0 | 1 | n | Yes | |
| Chloroform | 1.0 | ng/L | 1.0 | • | - | Yes | |
| Dichlorodifluoromethane | 2.0 | ng/L | 1.0 | • | - | Yes | |
| 1,2-Dichloroethane | 1.0 | ng/L | 1.0 | 1 | > | Yes | |
| Methyl Tert Butyl Ether | 1.0 | ng/L | 1.0 | | > | Yes | |
| Tert-Amyl Alcohol | 20 | ug/L | 1.0 | • | > | Yes | |
| Vinyl chloride | 1.0 | ug/t | 1.0 | ť | ם | ug/L 1.0 - U Yes | |

Sample ID: FA41752-10

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017 Matrix: Groundwater

| Analyte Name | Result | Units Dil | Units Dilution Factor La | Lab Flag | or Lab Flag Validation Re | Reportable |
|-------------------------|--------|-----------|--------------------------|----------|---------------------------|------------|
| Benzene | 1.0 | ug/L | 1.0 | ŧ | ב | Yes |
| Chloroform | 1.0 | ng/L | 1.0 | | Þ | Yes |
| Dichlorodifluoromethane | 2.0 | ng/L | 1.0 | 1 | D | Yes |
| 1,2-Dichloroethane | 1.0 | ng/L | 1.0 | • | | Yes |
| Methyl Tert Butyl Ether | 1.0 | ng/L | 1.0 | ι | | Yes |
| Tert-Amyl Alcohol | 20 | ng/L | 1.0 | | ⊃ | Yes |
| Vinyl chloride | 1.0 | ng/L | 1.0 | • | | Yes |

Sample ID: FA41752-2MS

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017 Matrix: Groundwater

METHOD: 8260C

| Analyte Name | Result | Units Dil | lution Factor | Lab Flag | Validation | Reportable | |
|-------------------------|--------|-----------|---------------|----------|------------|----------------|--|
| Benzene | 28.7 | ng/L | 1.0 | | • | Yes | |
| Chloroform | 24.8 | ng/L | 1.0 | | • | Yes | |
| Dichlorodifluoromethane | 25.0 | ng/L | 1.0 | , | | Yes | |
| 1,2-Dichloroethane | 25.0 | ng/L | 1.0 | ı | =, | Yes | |
| Methyl Tert Butyl Ether | 22.5 | ng/L | 1.0 | 1 | ŧ | Yes | |
| Tert-Amyl Alcohol | 219 | ng/L | 1.0 | 1 | ٠ | Yes | |
| Vinyl chloride | 25.3 | ug/L | 1.0 | • |) | ug/L 1.0 - Yes | |

Sample ID: FA41752-2MSD

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017 Matrix: Groundwater

| Analyte Name | Result | Units Dil | ution Factor | Lab Flag | Validation | t Units Dilution Factor Lab Flag Validation Reportable |
|-------------------------|--------|-----------|--------------|----------|------------|--|
| Senzene | 28.9 | ng/L | 1.0 | • | ı | Yes |
| Chloroform | 25.3 | ng/L | 1.0 | • | • | Yes |
| Dichlorodifluoromethane | 23.9 | ng/L | 1.0 | • | • | Yes |
| hloroethane | 24.6 | ng/L | 1.0 | • | • | Yes |
| Methyl Tert Butyl Ether | 23.1 | ng/L | 1.0 | • | ı | Yes |
| nyl Alcohol | 224 | ng/L | 1.0 | • | 1 | Yes |
| /inyl chloride | 24.3 | ng/L | 1.0 | ı | ı | Yes |

ORGANIC DATA SAMPLE SUMMARY

Sample ID: FA41752-1

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Equipment Blank

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ng/L Hexachlorobutadiene

Sample ID: FA41752-2

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ug/L 2.0 Hexachlorobutadiene

Sample ID: FA41752-3

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: AQ - Field Blank Water

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

Hexachlorobutadiene

Sample ID: FA41752-4

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable ug/L Result **Analyte Name** Hexachlorobutadiene

Sample ID: FA41752-5

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: AQ - Equipment Blank

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable ng/L Result Analyte Name Hexachlorobutadiene

Sample ID: FA41752-6

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

ug/L 2.0 Hexachlorobutadiene

Sample ID: FA41752-7

Sample location: BMSMC, Humacao, PR

3/2/2017 Sampling date: Matrix: Groundwater

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

Hexachlorobutadiene

ng/L

Sample ID: FA41752-8

Sample location: BMSMC, Humacao, PR

3/2/2017 Sampling date: Matrix: AQ - Field Blank

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable Result **Analyte Name**

Hexachlorobutadiene

ug/L

Sample ID: FA41752-9

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable Result Analyte Name

Hexachlorobutadiene

Sample ID: FA41752-10

Sample location: BMSMC, Humacao, PR

Sampling date: 3/2/2017

Matrix: Groundwater

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable Result 2.0 Analyte Name Hexachlorobutadiene

Sample ID: FA41752-2MS

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017

Matrix: Groundwater

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable ng/L Result 24.4 Analyte Name Hexachlorobutadiene

Sample ID: FA41752-2MSD

Sample location: BMSMC, Humacao, PR

Sampling date: 3/1/2017 Matrix: Groundwater

METHOD: 8260C

Units Dilution Factor Lab Flag Validation Reportable ng/L Result Analyte Name Hexachlorobutadiene

| Project Number:_FA41752 | | | |
|-----------------------------|--|--|--|
| Date:March_1-2,_2017 | | | |
| Shipping date:March_2,_2017 | | | |
| EPA Region:2 | | | |

REVIEW OF VOLATILE ORGANIC PACKAGE Low/Medium Volatile Data Validation

The following guidelines for evaluating volatile organics were created to delineate required validation actions. This document will assist the reviewer in using professional judgment to make more informed decision and in better serving the needs of the data users. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: USEPA Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation. July, 2015. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

| noted. | |
|--|---|
| The hardcopied (laboratory name)AccutestOrland has been reviewed and the quality control and perform VOCs included: | do data package received nance data summarized. The data review for |
| Lab. Project/SDG No.:FA41752 | |
| X Data CompletenessX Holding TimesX GC/MS TuningX Internal Standard PerformanceX BlanksX Surrogate RecoveriesX Matrix Spike/Matrix Spike Duplicate _OverallComments:Selected_VOA_(Hexachlorobuta_(SW846_8260C) | X Laboratory Control SpikesX Field DuplicatesX CalibrationsX Compound IdentificationsX Compound QuantitationX Quantitation Limits |
| Definition of Qualifiers: | |
| J- Estimated results U- Compound not detected R- Rejected data UJ- Estimated nondetect | |
| Reviewer: Rafuel Schfaut Date:June_22,_2017 | |

DATA COMPLETENESS

| MISSING INFORMATION | DATE LAB. CONTACTED | DATE RECEIVED |
|---------------------|---------------------|---------------|
| - | | |
| | | |
| _ | - | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | -2 | |
| | | |
| | | |
| | 4 | |
| | | |
| | \ | |
| | | |
| | | 2/20/2 |
| | | |
| | | |
| | | |
| · - | ····· | |
| | | V |
| | | 4 |
| | | |
| | | |
| | | |
| | | 9 |
| | | 8 |
| | | |

| All criteria were met_ | _X |
|------------------------|----|
| Criteria were not met | |
| and/or see below | |

HOLDING TIMES

The objective of this parameter is to ascertain the validity of the results based on the holding time of the sample from time of collection to the time of analysis.

Complete table for all samples and note the analysis and/or preservation not within criteria

| SAMPLE ID | DATE SAMPLED | DATE ANALYZED | рН | ACTION |
|-------------------|------------------------|-----------------------|----------|-------------------|
| | | | | |
| | | | - | |
| All comples and | vzad within mathad rad | commanded halding. Co | | |
| Ali samples arrai | yzed within method red | commended holding. Sa | ampies p | ropeny preserved. |
| | | | | |
| | | | | 100 |
| | | | | |

<u>Criteria</u>

Aqueous samples – 14 days from sample collection for preserved samples (pH \leq 2, 4 \pm 2°C), no air bubbles.

Aqueous samples – 7 days from sample collection for unpreserved samples, 4°C, no air bubbles.

Soil samples- 14 days from sample collection.

Cooler temperature (Criteria: 4 ± 2 °C): 3.7 – 4.1 °C - OK

<u>Actions</u>

Aqueous samples

- a. If there is no evidence that the samples were properly preserved (pH < 2, T = 4°C \pm 2°C), but the samples were analyzed within the technical holding time [7 days from sample collection], no qualification of the data is necessary.
- b. If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [7 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).
- c. If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.
- d. If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).
- e. If air bubbles were present in the sample vial used for analysis, qualify detected compounds as estimated (J-) and non-detected compounds as estimated (UJ).

Non-aqueous samples

a. If there is no evidence that the samples were properly preserved (T < -7°C or T = 4°C \pm 2°C and preserved with NaHSO₄), but the samples were analyzed within the technical holding time [14 days

from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as (UJ) or unusable (R) using professional judgment.

- b. If the samples were properly preserved, and the samples were analyzed within the technical holding time [14 days from sample collection], no qualification of the data is necessary.
- c. If there is no evidence that the samples were properly preserved, and the samples were analyzed outside of the technical holding time [14 days from sample collection], qualify detects for all volatile compounds as estimated (J) and non-detects as unusable (R).
- d. If the samples were properly preserved, but were analyzed outside of the technical holding time [14 days from sample collection], qualify detects as estimated (J) and non-detects as unusable (R).

Qualify TCLP/SPLP samples

- a. If the TCLP/SPLP ZHE procedure is performed within the extraction technical holding time of 14 days, detects and non-detects should not be qualified.
- b. If the TCLP/SPLP ZHE procedure is performed outside the extraction technical holding time of 14 days, qualify detects as estimated (J) and non-detects as unusable (R).
- c. If TCLP/SPLP aqueous samples and TCLP/SPLP leachate samples are analyzed within the technical holding time of 7 days, detects and non-detects should not be qualified.
- d. If TCLP/SPLP aqueous samples and TCLP/SPLP leachate samples are analyzed outside of the technical holding time of 7 days, qualify detects as estimated (J) and non-detects as unusable (R).

Table 1. Holding Time Actions for Low/Medium Volatile Analyses - Summary

| | | | Action | |
|-------------|-----------|-----------|-------------------------------------|---|
| Matrix | Preserved | Criteria | Detected Associated Compounds | Non-Detected Associated Compounds |
| | No | ≤ 7 days | No a | lalification |
| | No | > 7 days | T NO QC | R |
| Aqueous | Yes | ≤ 14 days | No qualification | |
| | Yes | > 14 days | J | R |
| | No | ≤ 14 days | J | Professional judgment, UJ or R |
| Non-Aqueous | Yes | ≤ 14 days | No qualification | |
| | Yes/No | > 14 days | J | R |
| TCLP/SPLP | Yes | ≤ 14 days | No qualification | |
| TCLP/SPLP | No | > 14 days | J | R |

| TCLP/SPLP | ZHE performed within the 14-day technical holding time | No qualification | | |
|---|---|------------------|----------------|--|
| TCLP/SPLP | ZHE performed outside the 14-day technical holding time | J R | | |
| TCLP/SPLP aqueous & TCLP/SPLP leachate | Analyzed within 7 days | No qualification | | |
| TCLP/SPLP aqueous & TCLP/SPLP leachate | Analyzed outside 7 days | J R | | |
| Sample temperature outside 4°C ± 2°C upon receipt at the laboratory | | Use profess | ional judgment | |
| Holding times grossly exceeded | | J R | | |

| All criteria were met | X |
|---------------------------------|---|
| Criteria were not met see below | |

GC/MS TUNING

The assessment of the tuning results is to determine if the sample instrumentation is within the standard tuning QC limits

__X__ The BFB performance results were reviewed and found to be within the specified criteria.
__X__ BFB tuning was performed for every 12 hours of sample analysis.

NOTES: All mass spectrometer instrument conditions must be identical to those used during the sample analysis. Background subtraction actions resulting in spectral distortions for the sole purpose of meeting the method specifications are contrary to the Quality Assurance (QA) objectives, and are therefore unacceptable.

NOTES: No data should be qualified based on BFB failure. Instances of this should be noted in the narrative.

All ion abundance ratios must be normalized to m/z 95, the nominal base peak, even though the ion abundance of m/z 174 may be up to 120% that of m/z 95.

Actions:

If samples are analyzed without a preceding valid instrument performance check, qualify all data in those samples as unusable (R).

If ion abundance criteria are not met, professional judgment may be applied to determine to what extent the data may be utilized. When applying professional judgment to this topic, the most important factors to consider are the empirical results that are relatively insensitive to location on the chromatographic profile and the type of instrumentation. Therefore, the critical ion abundance criteria for BFB are the m/z 95/96, 174/175, 174/176, and 176/177 ratios. The relative abundances of m/z 50 and 75 are of lower importance. This issue is more critical for Tentatively Identified Compounds (TICs) than for target analytes.

Note: State in the Data Review Narrative, decisions to use analytical data associated with BFB instrument performance checks not meeting contract requirements.

Note: Verify that that instrument instrument performance check criteria were achieved using techniques described in Low/Medium Volatiles Organic Analysis, Section II.D.5 of the SOM02.2 NFG, obtain additional information on the instrument performance checks. Make sure that background subtraction was performed from the BFB peak and not from background subtracting from the solvent front or from another region of the chromatogram.

| | mass calibration compound. | ether associated data should be q | dained based on the |
|---------------------|-----------------------------------|-----------------------------------|---------------------|
| List | the | samples | affected: |
| -2000 | | | |
| | | | |
| <u></u> | | | |
| If mass calibration | on is in error, all associated da | ata are rejected. | |

| All criteria were metX |
|------------------------|
| Criteria were not met |
| and/or see below |

CALIBRATION VERIFICATION

Compliance requirements for satisfactory instrument calibration are established to ensure that the instrument is capable of producing and maintaining acceptable quantitative data.

| Date of initial calibration: | 02/28/17 |
|--|-----------------|
| Dates of continuing (initial) calibrat | ion:02/28/17 |
| Dates of continuing calibration: | 03/07/17 |
| Dates of ending calibration:02/2 | 27/17;_03/07/17 |
| Instrument ID numbers: | _GCMSI |
| Matrix/Level:Aqueous/low | |
| | |

| DATE | LAB ID# | FILE | CRITERIA OUT RFs, %RSD, %D, r | COMPOUND | SAMPLES AFFECTED |
|------|------------|------|----------------------------------|----------|---------------------|
| | | | | | |
| | | | | <u> </u> | |
| | L | | | | |

Note: Initial calibration, initial calibration verification, and continuing calibration verification within the method and validation guidance document required performance criteria. Closing calibration check verification included in data package.

Criteria

The analyte calibration criteria in the following Table must be obtained. Analytes not meeting the criteria are qualified.

A separate worksheet should be filled for each initial curve.

Initial Calibration - Table 2. RRF, %RSD, and %D Acceptance Criteria for Initial Calibration and CCV for Low/Medium Volatile Analysis

| Analyte | Minimum RRF | Maximum %RSD | Opening Maximum %D ¹ | Closing Maximum %D |
|---------------------------------------|----------------|-----------------|------------------------------------|-----------------------|
| Dichlorodifluoromethane | 0.010 | 25.0 | ±40.0 | ±50.0 |
| Chloromethane | 0.010 | 20.0 | ±30.0 | ±50.0 |
| Vinyl chloride | 0.010 | 20.0 | ±25.0 | ±50.0 |
| Bromomethane | 0.010 | 40.0 | ±30.0 | ±50.0 |
| Chloroethane | 0.010 | 40.0 | ±25.0 | ±50.0 |
| Trichlorofluoromethane | 0.010 | 40.0 | ±30.0 | ±50.0 |
| 1.1-Dichloroethene | 0.060 | 20.0 | ±20.0 | ±25.0 |
| 1.1.2-Trichloro-1.2.2-trifluoroethane | 0.050 | 25.0 | ±25.0 | ±50.0 |
| Acetone | 0.010 | 40.0 | ±40.0 | ±50.0 |
| Carbon disulfide | 0.100 | 20.0 | ±25.0 | ±25.0 |
| Methyl acetate | 0.010 | 40.0 | ±40.0 | ±50.0 |
| Methylene chloride | 0.010 | 40.0 | ±30.0 | ±50.0 |
| trans-1.2-Dichloroethene | 0.100 | 20.0 | ±20.0 | ±25.0 |
| Methyl tert-butyl ether | 0.100 | 40.0 | ±25.0 | ±50.0 |
| 1.1-Dichloroethane | 0.300 | 20.0 | ±20.0 | ±25.0 |
| cis-1,2-Dichloroethene | 0.200 | 20.0 | ±20.0 | ±25.0 |
| 2-Butanone | 0.010 | 40.0 | ±40.0 | ±50.0 |
| Bromochloromethane | 0.100 | 20.0 | ±20.0 | ±25.0 |
| Chloroform | 0.300 | 20.0 | ±20.0 | ±25.0 |
| 1.1.1-Trichloroethane | 0.050 | 20.0 | ±25.0 | ±25.0 |
| Cyclohexane | 0.010 | 40.0 | ±25.0 | ±50.0 |
| Carbon tetrachloride | 0.100 | 20.0 | ±25.0 | ±25.0 |
| Benzene | 0.200 | 20.0 | ±20.0 | ±25.0 |
| 1.2-Dichloroethane | 0.070 | 20.0 | ±20.0 | ±25.0 |
| Trichloroethene | 0.200 | 20.0 | ±20.0 | ±25.0 |
| Methylcyclohexane | 0.050 | 40.0 | ±25.0 | ±50.0 |
| 1.2-Dichloropropane | 0.200 | 20.0 | ±20.0 | ±25.0 |
| Bromodichloromethane | 0.300 | 20.0 | ±20.0 | ±25.0 |
| cis-1.3-Dichloropropene | 0.300 | 20.0 | ±20.0 | ±25.0 |
| 4-Methyl-2-pentanone | 0.030 | 25.0 | ±30.0 | ±50.0 |
| Toluene | 0.300 | 20.0 | ±20.0 | ±25.0 |
| trans-1.3-Dichloropropene | 0.200 | 20.0 | ±20.0 | ±25.0 |
| 1.1.2-Trichloroethane | 0.200 | 20.0 | ±20.0 | ±25.0 |
| Tetrachloroethene | 0.100 | 20.0 | ±20.0 | ±25.0 |
| 2-Hexanone | 0.010 | 40.0 | ±40.0 | ±50.0 |
| Dibromochloromethane | 0.200 | 20.0 | ±20.0 | ±25.0 |
| 1,2-Dibromoethane | 0.200 | 20.0 | ±20.0 | ±25.0 |
| Chlorobenzene | 0.400 | 20.0 | ±20.0 | ±25.0 |
| Ethylbenzene | 0.400 | 20.0 | ±20.0 | ±25.0 |

| Analyte | Minimum RRF | Maximum %RSD | Opening Maximum %D ¹ | Closing Maximum |
|---------------------------------------|----------------|-----------------|------------------------------------|--------------------|
| m.p-Xylene | 0.200 | 20.0 | ±20.0 | ±25.0 |
| o-Xylene | 0.200 | 20.0 | ±20.0 | ±25.0 |
| Styrene | 0.200 | 20.0 | ±20.0 | ±25.0 |
| Bromoform | 0.100 | 20.0 | ±25.0 | ±50.0 |
| Isopropylbenzene | 0.400 | 20.0 | ±25.0 | ±25.0 |
| 1.1.2.2-Tetrachloroethane | 0.200 | 20.0 | ±25.0 | ±25.0 |
| 1.3-Dichlorobenzene | 0.500 | 20.0 | ±20.0 | ±25.0 |
| 1.4-Dichlorobenzene | 0.600 | 20.0 | ±20.0 | ±25.0 |
| 1.2-Dichlorobenzene | 0.600 | 20.0 | ±20.0 | ±25.0 |
| 1.2-Dibromo-3-chloropropane | 0.010 | 25.0 | ±30.0 | ±50.0 |
| 1.2.4-Trichlorobenzene | 0.400 | 20.0 | ±30.0 | ±50.0 |
| 1.2.3-Trichlorobenzene | 0.400 | 25.0 | ±30.0 | ±50.0 |
| Deuterated Monitoring Compound | d | | | |
| Vinyl chloride-d3 | 0.010 | 20.0 | ±30.0 | ±50.0 |
| Chloroethane-ds | 0.010 | 40.0 | ±30.0 | ±50.0 |
| 1.1-Dichloroethene-da | 0.050 | 20.0 | ±25.0 | ±25.0 |
| 2-Butanone-ds | 0.010 | 40.0 | ±40.0 | ±50.0 |
| Chloroform-d | 0.300 | 20.0 | ±20.0 | ±25.0 |
| 1.2-Dichloroethane-d4 | 0.060 | 20.0 | ±25.0 | ±25.0 |
| Benzene-d ₆ | 0.300 | 20.0 | ±20.0 | ±25.0 |
| 1.2-Dichloropropane-d₀ | 0.200 | 20.0 | ±20.0 | ±25.0 |
| Toluene-ds | 0.300 | 20.0 | ±20.0 | ±25.0 |
| trans-1.3-Dichloropropene-d4 | 0.200 | 20.0 | ±20.0 | ±25.0 |
| 2-Hexanone-ds | 0.010 | 40.0 | ±40.0 | ±50.0 |
| 1.1.2.2-Tetrachloroethane-d2 | 0.200 | 20.0 | ±25.0 | ±25.0 |
| 1.2-Dichlorobenzene-d4 | 0.400 | 20.0 | ±20.0 | ±25.0 |

If a closing CCV is acting as an opening CCV, all target analytes and DMCs must meet the requirements for an opening CCV.

Actions:

- 1. If any volatile target compound has an RRF value less than the minimum in the table, use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J+ or R).
 - a. If any volatile target compound has an RRF value less than the minimum criterion, qualify non-detected compounds as unusable (R).
 - b. If any of the volatile target compounds listed in the Table has %RSD greater than the criteria, qualify detects as estimated (J), and non-detected compounds using professional judgment.
 - c. If the volatile target compounds meet the acceptance criteria for RRF and the %RSD, no qualification of the data is necessary.

- d. No qualification of the data is necessary on the DMC RRF and %RSD data alone. Use professional judgment and follow the guidelines in Action 2 to evaluate the DMC RRF and %RSD data in conjunction with the DMC recoveries to determine the need for qualification of data.
- 2. At the reviewer's discretion, and based on the project-specific Data Quality Objectives (DQOs), a more in-depth review may be considered using the following guidelines:
 - a. If any volatile target compound has a %RSD greater than the maximum criterion in the Table, and if eliminating either the high or the low-point of the curve does not restore the %RSD to less than or equal to the required maximum:
 - Qualify detects for that compound(s) as estimated (J).
 - ii. Qualify non-detected volatile target compounds using professional judgment.
 - b. If the high-point of the curve is outside of the linearity criteria (e.g., due to saturation):
 - i. Qualify detects outside of the linear portion of the curve as estimated (J).
 - ii. No qualifiers are required for detects in the linear portion of the curve.
 - iii. No qualifiers are required for volatile target compounds that were not detected.
 - c. If the low-point of the curve is outside of the linearity criteria:
 - i. Qualify low-level detects in the area of non-linearity as estimated (J).
 - ii. No qualifiers are required for detects in the linear portion of the curve.
 - iii. For non-detected volatile compounds, use the lowest point of the linear portion of the curve to determine the new quantitation limit.

Note: If the laboratory has failed to provide adequate calibration information, inform the Region's designated representative to contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.

State in the Data Review Narrative, if possible, the potential effects on the data due to calibration criteria exceedance.

Note, for the Laboratory COR action, if calibration criteria are grossly exceeded.

Table. Initial Calibration Actions for Low/Medium Volatile Analysis – Summary

| Criteria | Action | | |
|---|---|-----------------------------------|--|
| Cinetta | Detect | Non-detect | |
| Initial Calibration not performed at specified frequency and sequence | Use professional judgment R | Use professional judgment R | |
| Initial Calibration not performed at the specified concentrations | J | UJ | |
| RRF < Minimum RRF in Table for tanget analyte | Use professional judgment J+ or R | R | |
| RRF > Minimum RRF in Table for target analyte | No qualification | No qualification | |
| *ARSD = Maximumi *ARSD in Table for target analyte | J | Use professional judgment | |
| %RSD = Maximum %RSD in Table for target analyte | No qualification | No qualification | |

| All criteria were met _X_ | |
|---------------------------|--|
| Criteria were not met | |
| and/or see below | |

Continuing Calibration Verification (CCV)

NOTE: Verify that the CCV was run at the required frequency (an opening and closing CCV must be run within 12-hour period) and the CCV was compared to the correct initial calibration. If the mid-point standard from the initial calibration is used as an opening CCV, verify that the result (RRF) of the mid-point standard was compared to the average RRF from the correct initial calibration.

The closing CCV used to bracket the end of a 12-hour analytical sequence may be used as the opening CCV for the new 12-hour analytical sequence, provided that all the technical acceptance criteria are met for an opening CCV (see criteria show before in the Table) . If the closing CCV does not meet the technical acceptance criteria for an opening CCV, then a BFB tune followed by an opening CCV is required and the next 12-hour time period begins with the BFB tune.

All DMCs must meet RRF criteria. No qualification of the data is necessary on the DMCs RRF and %RSD/%D data alone. However, use professional judgment to evaluate the DMC and %RSD/%D data in conjunction with the DMC recoveries to determine the need of qualification the data.

Action:

- 1. If a CCV (opening and closing) was not run at the appropriate frequency, qualify data using professional judgment.
- Qualify all volatile target compounds in Table shown before using the following criteria:
 - a. For an opening CCV, if any volatile target compound has an RRF value less than the minimum criterion, use professional judgment for detects, based on mass spectral identification, to qualify the data as estimated (J) and qualify non-detected compounds as unusable (R).
 - b. For a closing CCV, if any volatile target compound has an RRF value less than the criteria, use professional judgment for detects based on mass spectral identification to qualify the data as estimated (J), and qualify non-detected compounds as unusable (R).
 - c. For an opening CCV, if the Percent Difference value for any of the volatile target compounds is outside the limits in calibration criteria Table shown before, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
 - d. For a closing CCV, if the Percent Difference value for any volatile target compound is outside the limits in calibration criteria table, qualify detects as estimated (J) and non-detected compounds as estimated (UJ).
 - e. If the volatile target compounds meet the acceptable criteria for RRF and the Percent Difference, no qualification of the data is necessary.

f. No qualification of the data is necessary on the DMC RRF and the Percent Difference data alone. Use professional judgment to evaluate the DMC RRF and Percent Difference data in conjunction with the DMC recoveries to determine the need for qualification of data.

Notes: If the laboratory has failed to provide adequate calibration information, inform the Region's designated representative to contact the laboratory and request the necessary information. If the information is not available, the reviewer must use professional judgment to assess the data.

State in the Data Review Narrative, if possible, the potential effects on the data due to calibration criteria exceedance.

Note, for Contract Laboratory COR action, if calibration criteria are grossly exceeded.

Table. Continuing Calibration Actions for Low/Medium Volatile Analysis – Summary

| Criteria for Opening | Criteria for | Action | | |
|---|---|--|-----------------------------------|--|
| CCV | Closing CCV | Detect | Non-detect | |
| CCV not performed at required frequency | CCV not performed at required frequency | Use professional judgment R | Use professional judgment R | |
| CCV not performed at specified concentration | CCV not performed at specified concentration | Use professional judgment | Use professional judgment | |
| RRF < Minimum RRF in Table 2 for target analyte | RRF < Minimum RRF in Table for target analyte | Use professional judgment J or R | R | |
| RRF ≥ Minimum RRF in Table 2 for target analyte | RRF ≥ Minimum RRF in Table for target analyte | No qualification | No qualification | |
| oD outside the Opening Maximum oD limits in Table 2 for target analyte | %D outside the Closing Maximum %D limits in Table for target analyte | 1 | UJ | |
| %D within the inclusive Opening Maximum %D limits in Table 2 for target analyte | %D within the inclusive Closing Maximum %D limits in Table for target analyte | No qualification | No qualification | |

| All criteria were met _ | = 12 |
|-------------------------|------|
| Criteria were not met | 8-3 |
| and/or see below | _X |

BLANK ANALYSIS RESULTS (Sections 1 & 2)

The assessment of the blank analysis results is to determine the existence and magnitude of contamination problems. The criteria for evaluation of blanks apply only to blanks associated with the samples, including trip, equipment, and laboratory blanks. If problems with any blanks exist, all data associated with the case must be carefully evaluated to determine whether or not there is an inherent variability in the data for the case, or if the problem is an isolated occurrence not affecting other data.

List the contamination in the blanks below. High and low levels blanks must be treated separately.

The concentration of a target analyte in any blank must not exceed its Contract Required Quantitation Limit (CRQL) (2x CRQLs for Methylene chloride, Acetone, and 2-Butanone). TIC concentration in any blanks must be $\leq 5.0 \,\mu\text{g/L}$ for water (0.0050 mg/L for TCLP leachate) and $\leq 5.0 \,\mu\text{g/kg}$ for soil matrices.

Laboratory blanks

DATE

The method blank, like any other sample in the SDG, must meet the technical acceptance criteria for sample analysis.

| ANALYZED | LABID | MATRIX | COMPOUND | UNITS |
|------------------------------------|---|-------------------|---|---|
| | | | ks_except_for_the_case | s_described_in_this |
| _03/07/17 | VI1286-MB | | | ne0.52_ug/l |
| Note: | 6.Laboratory qualithe reporting lin No additional q | ualified the resu | lts as JB. Result was quoutadiene not detected in | ng limit in sample FA41752- lalified as non-detected (U) and the other program samples |
| Field/Equipme | · | | | |
| If field or trip be the method bla | lanks are preser nks. | t, the data revie | ewer should evaluate thi | s data in a similar fashion as |
| DATE ANALYZED | LAB ID | LEVEL/ MATRIX | COMPOUND | CONCENTRATION UNITS |
| | | | | o_trip_blank_analyzed_in |
| Note: | | | | |

All criteria were met __X___ Criteria were not met and/or see below ____

BLANK ANALYSIS RESULTS (Section 3)

Blank Actions

Note:

All fields blank results associated with a particular group of samples (may exceed one per case) must be used to qualify data. Trip blanks are used to qualify only those samples with which they were shipped. Blanks may not be qualified because of contamination in another blank. Field blanks and trip blanks must be qualified for system monitoring compounds, instrument performance criteria, and spectral or calibration QC problems.

Samples taken from a drinking water tap do not have associated field blanks.

When applied as described in the Table below, the contaminant concentration in the blank is multiplied by the sample dilution factor.

Table. Blank and TCLP/SPLP LEB Actions for Low/Medium Volatile Analysis

| Blank Type | Blank Result | Sample Result | Action for Samples |
|--------------------------------------|---------------------|-----------------------------------|--|
| Detects | Detects | Not detected | No qualification required |
| | < CRQL * | < CRQL* | Report CRQL value with a U |
| | S C NQL | ≥ CRQL* | No qualification required |
| Method. | | < CRQL* | Report CRQL value with a U |
| Storage, Field, Trip, TCLP/SPLP LEB. | ≥ CRQL* and ≤ | Report blank value for sample | |
| | > CRQL * | blank concentration | concentration with a U |
| | | ≥ CRQL* and > blank concentration | No qualification required |
| Instrument** | = CRQL* | ≤CRQL* | Report CRQL value with a U |
| Gross | CRQL | > CRQL* | No qualification required |
| | Gross contamination | Detects | Report blank value for sample concentration with a U |

^{* 2}x the CRQL for methylene chloride, 2-butanone and acetone.

Action Levels (ALs) should be based upon the highest concentration of contaminant determined in any blank. Do not qualify any blank with another blank. The ALs for samples which have been diluted should be corrected for the sample dilution factor and/or % moisture, where applicable. No positive sample results should be reported unless the concentration of the compound in the samples exceeds the ALs:

^{**} Qualifications based on instrument blank results affect only the sample analyzed immediately after the sample that has target compounds that exceed the calibration range or non-target compounds that exceed 100 µg/L.

Notes:

High and low level blanks must be treated separately Compounds qualified "U" for blank contamination are still considered "hits" when qualifying for calibration criteria.

| CONTAMINATION SOURCE/LEVEL | COMPOUND | CONC/UNITS | AL/UNITS | SQL | AFFECTED SAMPLES |
|---|----------|------------|----------|-----|------------------|
| | | | | | |
| | | | | | |
| | | | | 0 | |
| | | | | | |
| | | -4 | N. | | |
| | | | | | |
| | | - | İ | | |
| | | | | | |
| | | | | | |
| | | - | | | |
| | | 1 | | | |
| Value of the same | -,: | | | | |

| All criteria were met _ | _X | _ |
|-------------------------|----|---|
| Criteria were not met | | |
| and/or see below | | |

DEUTERATED MONITORING COMPOUNDS (DMCs)

Laboratory performance of individual samples is established by evaluation of surrogate spike (DMCs) recoveries. All samples are spiked with surrogate compounds prior to sample analysis. The accuracy of the analysis is measured by the surrogate percent recovery. Since the effects of the sample matrix are frequently outside the control of the laboratory and may present relatively unique problems, the validation of data is frequently subjective and demands analytical experience and professional judgment.

Table. Volatile Deuterated Monitoring Compounds (DMCs) and Recovery Limits

| DMC | %R for Water Sample | %R for Soil Sample |
|------------------------|---------------------|--------------------|
| Vinyl chloride-d3 | 60-135 | 30-150 |
| Chloroethane-d5 | 70-130 | 30-150 |
| 1,1-Dichloroethene-d2 | 60-125 | 45-110 |
| 2-Butanone-d5 | 40-130 | 20-135 |
| Chloroform-d | 70-125 | 40-150 |
| 1,2-Dichloroethane-d4 | 70-125 | 70-130 |
| Benzene-d6 | 70-125 | 20-135 |
| 1.2-Dichloropropane-d6 | 70-120 | 70-120 |
| Toluene-d8 | 80-120 | 30-130 |
| trans-1,3- | 60-125 | 30-135 |
| Dichloropropene-d4 | | |
| 2-Hexanone-d5 | 45-130 | 20-135 |
| 1,1,2,2- | 65-120 | 45-120 |
| Tetrachloroethane-d2 | | |
| 1,2-Dichlorobenzene-d4 | 80-120 | 75-120 |

NOTE: The recovery limits for any of the compounds listed in the above Table may be expanded at any time during the period of performance if the United States Environmental Protection Agency (EPA) determines that the limits are too restrictive.

Action:

Are recoveries for DMCs in volatile samples and blanks must be within the limits specified in the Table above.

Yes? or No?

NOTE: The recovery limits for any of the compounds listed in the Table above may be expanded at any time during the period of performance if USEPA determines that the limits are too restrictive.

| Sample ID | tnat may fai Date | to meet the recovery limits DMCs | % Recovery | Action | |
|-----------|----------------------|-----------------------------------|------------|--------|---|
| | | | | | - |
| | | | | | |

Note: DMCs recoveries within the laboratory required control limits and within the guidance document performance criteria (80 - 120). Other non-deuterated surrogates added to the samples within laboratory control limits.

Note: Any sample which has more than 3 DMCs outside the limits must be reanalyzed.

Action:

- 1. For any recovery greater than the upper acceptance limit:
 - a. Qualify detected associated volatile target compounds as estimated high (J+).
 - b. Do not qualify non-detected associated volatile target compounds.
- 2. For any recovery greater than or equal to 10%, and less than the lower acceptance limit:
 - Qualify detected associated volatile target compounds as estimated low (J-).
 - b. Qualify non-detected associated volatile target compounds as estimated (UJ).
- 3. For any recovery less than 10%:
 - Qualify detected associated volatile target compounds as estimated low (J-).
 - b. Qualify non-detected associated volatile target compounds as unusable (R).
- 4. For any recovery within acceptance limits, no qualification of the data is necessary.
- In the special case of a blank analysis having DMCs out of specification, the reviewer must give special consideration to the validity of associated sample data. The basic concern is whether the blank problems represent an isolated problem with the blank alone, or whether there is a fundamental problem with the analytical process. For example, if one or more samples in the batch show acceptable DMC recoveries, the reviewer may choose to consider the blank problem to be an isolated occurrence. However, even if this judgment allows some use of the affected data, note analytical problems for Contract Laboratory COR action.
- 6. If more than three DMCs are outside of the recovery limits for Low/Medium volatiles analysis and the sample was not reanalyzed, note under Contract Problems/Non-Compliance.

Table. Deuterated Monitoring Compound (DMC) Recovery Actions for Low/Medium Volatiles Analyses – Summary

| | Action | | |
|---|--------------------------------|--------------------------------------|--|
| Criteria | Detect Associated Compounds | Non-detected Associated Compounds | |
| ⁹ ôR ≤ 10°, ô | J- | R | |
| 10° ô ≤ ° ôR < Lower Acceptance Limit | J- | UJ | |
| Lower Acceptance Limit \leq % $R \leq Upper$ Acceptance Limit | No qualification | No qualification | |
| %R > Upper Acceptance Limit | J+ | No qualification | |

TABLE. VOLATILE DEUTERATED MONITORING COMPOUNDS (DMCs) AND THE ASSOCIATED TARGET COMPOUNDS

| Vinyl chloride-d3 (DMC-1) | Chloroethane-ds (DMC-2) | 1,1-Dichloroethene-d2 (DMC-3) |
|---|--|---|
| Vinyl chloride | Dichlorodifluoromethane Chloromethane Bromomethane Chloroethane Carbon disulfide | trans-1.2-Dichloroethene cis-1.2-Dichloroethene 1.1-Dichloroethene |
| 2-Butanone-ds (DMC-4) | Chloroform-d (DMC-5) | 1,2-Dichloroethane-d4 (DMC-6) |
| Acetone 2-Butanone | 1.1-Dichloroethane Bromochloromethane Chloroform Dibromochloromethane Bromoform | Trichloroftuoromethane 1.1.2-Trichloro-1.2.2-trifluoroethane Methyl acetate Methyl-tent-butyl ether 1.1.1-Trichloroethane Carbon tetrachloride 1.2-Dibromoethane 1.2-Dichloroethane |
| Benzene-ds (DMC-7) | 1,2-Dichloropropane-da (DMC-8) | Toluene-ds (DMC-9) |
| Benzene | Cyclohexane Methylcyclohexane 1.2-Dichloropropane Bromodichloromethane | Trichloroethene Toluene Tetrachloroethene Ethylbenzene o-Xylene m.p-Xylene Styrene Isopropylbenzene |
| trans-1,3-Dichloropropene-d4 (DMC-10) | 2-Hexanone-ds (DMC-11) | 1,1,2,2-Tetrachloroethane-d2 (DMC-12) |
| cis-1.3-Dichloropropene trans-1.3-Dichloropropene 1,1,2-Trichloroethane | 4-Methyl-2-pentanone 2-Hexanone | 1.1.2.2Tetrachloroethane 1.2-Dibromo-3-chloropropane |
| 1,2-Dichlorobenzene-d4 (DMC-13) | | |
| Chlorobenzene 1.3-Dichlorobenzene 1.4-Dichlorobenzene 1.2-Dichlorobenzene 1.2.4-Trichlorobenzene 1.2.3-Trichlorobenzene | | |

| All criteria were met | _X | |
|-----------------------|----|-----|
| Criteria were not met | | |
| and/or see below | | -,1 |

MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

This data is generated to determine long term precision and accuracy in the analytical method for various matrices. This data alone cannot be used to evaluate the precision and accuracy of individual samples. If any % R in the MS or MSD falls outside the designated range, the reviewer should determine if there are matrix effects, i.e. LCS data are within the QC limits but MS/MSD data are outside QC limit.

NOTES:

Data for MS and MSDs will not be present unless requested by the Region. Notify the Contract Laboratory COR if a field or trip blank was used for the MS and MSD.

For a Matrix Spike that does not meet criteria, apply the action to only the field sample used to prepare the Matrix Spike sample. If it is clearly stated in the data validation materials that the samples were taken through incremental sampling or some other method guaranteeing the homogeneity of the sample group, then the entire sample group may be qualified.

MS/MSD Recoveries and Precision Criteria

The laboratory should use one MS and a duplicate analysis of an unspiked field sample if target analytes are expected in the sample. If target analytes are not expected, MS/MSD should be analyzed.

List the %Rs, RPD of the compounds which do not meet the criteria.

Sample ID: FA41752-2MS/-2MSD_ Matrix/Level: Groundwater___ The QC reported here applies to the following samples: Method: SW846 8260C FA41752-1, FA41752-2, FA41752-3; FA41752-4, FA41752-5, FA41752-6; FA41752-7, FA41752-8, FA41752-9; FA41752-10 FA41752-2 MS MS MSD Spike Spike MSD Limits Compound ug/l Q ug/ % % RPD ug/l uq/l ug/l Rec/RPD

Note: MS/MSD % recoveries and RPD within laboratory control limits.

Note:

- * QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- * If QC limits are not available, use limits of 70 130 %.

Actions:

1. No qualification of the data is necessary on MS and MSD data alone. However, using professional judgment, the validator may use the MS and MSD results in conjunction with other QC criteria and determine the need for some qualification of the data.

| QUALITY | %R < LL | %R > UL |
|--------------------|---------|---------|
| Positive results | J | J |
| Nondetects results | R | Accept |

MS/MSD criteria apply only to the unspiked sample, its dilutions, and the associated MS/MSD samples:

If the % R for the affected compounds were < LL (or 70 %), qualify positive results (J) and nondetects (UJ).

If the % R for the affected compounds were > UL (or 130 %), only qualify positive results (J).

If 25 % or more of all MS/MSD %R were < LL (or 70 %) or if two or more MS/MSD %Rs were < 10%, qualify all positive results (J) and reject nondetects (R).

A separate worksheet should be used for each MS/MSD pair.

| All criteria were met _ | _X |
|-------------------------|----|
| Criteria were not met | |
| and/or see below | |

LABORATORY CONTROL SAMPLE (LCS) ANALYSIS

This data is generated to determine accuracy of the analytical method for various matrices.

LCS Recoveries Criteria

Where LCS spiked with the same analyte at the same concentrations as the MS/MSD? **Yes** or No. If no make note in data review memo.

List the %R of compounds which do not meet the criteria

| | LCS ID | COMPOUND | % R | QC LIMIT |
|--|--------|----------|-----|----------|
| _Recoveries_(blank_spike)_within_laboratory_control_limits | | | | |
| - | | | | |
| | 0.05 | | | * |
| | | | | |
| | | | | |

Note:

- * QC limits are laboratory in-house performance criteria, LL = lower limit, UL = upper limit.
- * If QC limits are not available, use limits of 70 130 %.

Actions:

| QUALITY | %R < LL | %R > UL |
|--------------------|---------|---------|
| Positive results | J | J |
| Nondetects results | R | Accept |

All analytes in the associated sample results are qualified for the following criteria.

If 25 % of the LCS recoveries were < LL (or 70 %), qualify all positive results (j) and reject nondetects (R).

If two or more LCS were below 10 %, qualify all positive results as (J) and reject nondetects (R).

2. Frequency Criteria:

Where LCS analyzed at the required frequency and for each matrix? <u>Yes</u> or No. If no, the data may be affected. Use professional judgment to determine the severity of the effect and qualify data accordingly. Discuss any actions below and list the samples affected.

| | | All criteria were met Criteria were not met and/or see belowN/A |
|-----|--------------------------------------|---|
| IX. | FIELD/LABORATORY DUPLICATE PRECISION | |
| | Sample IDs: | Matrix: |

Field/laboratory duplicates samples may be taken and analyzed as an indication of overall precision. These analyses measure both field and lab precision; therefore, the results may have more variability than laboratory duplicates which only laboratory performance. It is also expected that soil duplicate results will have a greater variance than water matrices due to difficulties associated with collecting identical field duplicate samples.

The project QAPP should be reviewed for project-specific information.

NOTE: In the absence of QAPP guidance for validating data from field duplicates, the following action will be taken.

Identify which samples within the data package are field duplicates. Estimate the relative percent difference (RPD) between the values for each compound. Use professional judgment to note large RPDs (> 50%) in the narrative.

| COMPOUND | SQL | SAMPLE CONC. | DUPLICATE CONC. | RPD | ACTION |
|----------|-----|--------------|-----------------|-----|---|
| | | | | | ISD % recovery RPD used to ytes detected at concentration |

Actions:

Qualify as estimated positive results (J) and nondetects (UJ) for the compound that exceeded the above criteria. For organics, only the sample and duplicate will be qualified.

If an RPD cannot be calculated because one or both of the sample results is not detected, the following actions are suggested based on professional judgment:

If one sample result is not detected and the other is greater than 5x the SQL qualify (J/UJ).

If one sample value is not detected and the other is greater than 5x the SQL and the SQLs for the sample and duplicate are significantly different, use professional judgment to determine if qualification is appropriate.

If one sample value is not detected and the other is less than 5x, use professional judgment to determine if qualification is appropriate.

If both sample and duplicate results are not detected, no action is needed.

| All criteria were met | _X |
|-----------------------|----|
| Criteria were not met | |
| and/or see below | |

X. INTERNAL STANDARD PERFORMANCE

The assessment of the internal standard (IS) parameter is used to assist the data reviewer in determining the condition of the analytical instrumentation.

DATE SAMPLE ID IS OUT IS AREA ACCEPTABLE ACTION RANGE

Internal standard area within laboratory control limits.

Action:

- 1. If an internal standard area count for a sample or blank is greater than 200.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration) (see Table below):
 - a. Qualify detects for compounds quantitated using that internal standard as estimated low (J-).
 - Do not qualify non-detected associated compounds.
- 2. If an internal standard area count for a sample or blank is less than 20.0% of the area for the associated standard (opening CCV or mid-point standard from initial calibration):
 - a. Qualify detects for compounds quantitated using that internal standard as estimated high (J+).
 - b. Qualify non-detected associated compounds as unusable (R).
- 3. If an internal standard area count for a sample or blank is greater than or equal to 20.0%, and less than or equal to 200% of the area for the associated standard opening CCV or midpoint standard from initial calibration, no qualification of the data is necessary.
- If an internal standard RT varies by more than 30.0 seconds: Examine the chromatographic profile for that sample to determine if any false positives or negatives exist. For shifts of a large magnitude, the reviewer may consider partial or total rejection of the data for that sample fraction. Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.
- 5. If an internal standard RT varies by less than or equal to 30.0 seconds, no qualification of the data is necessary.

Note: Inform the Contract Laboratory Program Project Officer (CLP PO) if the internal standard performance criteria are grossly exceeded. Note in the Data Review Narrative potential effects on the data resulting from unacceptable internal standard performance.

- 6. If required internal standard compounds are not added to a sample or blank, qualify detects and non-detects as unusable (R).
- 7. If the required internal standard compound is not analyzed at the specified concentration in a sample or blank, use professional judgment to qualify detects and non-detects.

Table. Internal Standard Actions for Low/Medium Volatiles Analyses - Summary

| | Act | Action | |
|--|--------------------------------------|--|--|
| Criteria | Detected Associated Compounds* | Non-detected Associated Compounds* | |
| Area counts > 200% of 12-hour standard (opening CCV or mid-point standard from initial calibration) | J- | No qualification | |
| Area counts < 20% of 12-hour standard (opening CCV or mid-point standard from initial calibration) | J÷ | R | |
| Area counts $\geq 50\%$ but $\leq 200\%$ of 12-hour standard (opening CCV or mid-point standard from initial calibration) | No qualification | | |
| RT difference > 30.0 seconds between samples and 12-hour standard (opening CCV or mid-point standard from initial calibration) | R ** | R | |
| RT difference ≤ 30.0 seconds between samples and 12-hour standard (opening CCV or mid-point standard from initial calibration) | No qual | ification | |

^{*} For volatile compounds associated to each internal standard, see TABLE - VOLATILE TARGET ANALYTES, DEUTERATED MONITORING COMPOUNDS WITH ASSOCIATED INTERNAL STANDARDS FOR QUANTITATION in SOM02.2, Exhibit D, available at: http://www.epa.gov/superfund/programs/clp/download/som/som22d.pdf ** Detects should not need to be qualified as unusable (R) if the mass spectral criteria are met.

| | | Criteria were not met and/or see below |
|--|---|--|
| TARGET COM | POUND IDENTIFICATION | |
| Criteria: | | |
| Is the Relative standard RRT initial calibration | e Retention Times (RRTs) of reported co [opening Continuing Calibration Verification]. | ompounds within ±0.06 RRT units of the on (CCV) or mid-point standard from the <u>Yes</u> ? or No? |
| List compound | s not meeting the criteria described above: | |
| Sample ID | Compounds | Actions |
| | | |
| | | |
| | | |
| spectrum from | of the sample compound and a current lab the associated calibration standard (open ust match according to the following criteria: All ions present in the standard mass sp | ing CCV or mid-point standard from initial pectrum at a relative intensity greater than |
| b. | | t agree within ±20% between the standard th an abundance of 50% in the standard |
| C. | lons present at greater than 10% in the s | sample mass spectrum, but not present in ated by a reviewer experienced in mass |
| List compound | s not meeting the criteria described above: | |
| Sample ID | Compounds | Actions |

Action:

- 1. The application of qualitative criteria for GC/MS analysis of target compounds requires professional judgment. It is up to the reviewer's discretion to obtain additional information from the laboratory. If it is determined that incorrect identifications were made, qualify all such data as unusable (R).
- 2. Use professional judgment to qualify the data if it is determined that cross-contamination has occurred.
- 3. Note in the Data Review Narrative any changes made to the reported compounds or concerns regarding target compound identifications. Note, for Contract Laboratory COR action, the necessity for numerous or significant changes.

TENTATIVELY IDENTIFIED COMPOUNDS (TICS)

NOTE: Tentatively identified compounds should only be evaluated when requested by a party from outside of the Hazardous Waste Support Section (HWSS).

List TICs

| Sample ID | Compound | Sample ID | Compound |
|-----------|----------|-----------|----------|
| | | | |
| | | | |
| | | | |

Action:

- 1. Qualify all TIC results for which there is presumptive evidence of a match (e.g. greater than or equal to 85% match) as tentatively identified (NJ), with approximated concentrations. TICs labeled "unknown" are qualified as estimated (J).
- 2. General actions related to the review of TIC results are as follows:
 - a. If it is determined that a tentative identification of a non-target compound is unacceptable, change the tentative identification to "unknown" or another appropriate identification, and qualify the result as estimated (J).
 - b. If all contractually-required peaks were not library searched and quantitated, the Region's designated representative may request these data from the laboratory.
- 3. In deciding whether a library search result for a TIC represents a reasonable identification, use professional judgment. If there is more than one possible match, report the result as "either compound X or compound Y". If there is a lack of isomer specificity, change the TIC result to a nonspecific isomer result (e.g., 1,3,5-trimethyl benzene to trimethyl benzene

- isomer) or to a compound class (e.g., 2-methyl, 3-ethyl benzene to a substituted aromatic compound).
- 4. The reviewer may elect to report all similar compounds as a total (e.g., all alkanes may be summarized and reported as total hydrocarbons).
- 5. Target compounds from other fractions and suspected laboratory contaminants should be marked as "non-reportable".
- 6. Other Case factors may influence TIC judgments. If a sample TIC match is poor, but other samples have a TIC with a valid library match, similar RRT, and the same ions, infer identification information from the other sample TIC results.
- 7. Note in the Data Review Narrative any changes made to the reported data or any concerns regarding TIC identifications.
- 8. Note, for Contract Laboratory COR action, failure to properly evaluate and report TICs

| All criteria were met _ | _X | _ |
|-------------------------|----|---|
| Criteria were not met | | |
| and/or see below | | |

SAMPLE QUANTITATION AND REPORTED CONTRACT REQUIRED QUANTITATION LIMITS (CRQLS)

Action:

- 1. If any discrepancies are found, the Region's designated representative may contact the laboratory to obtain additional information that could resolve any differences. If a discrepancy remains unresolved, the reviewer must use professional judgment to decide which value is the most accurate. Under these circumstances, the reviewer may determine that qualification of data is warranted. Note in the Data Review Narrative a description of the reasons for data qualification and the qualification that is applied to the data.
- 2. For non-aqueous samples, in the percent moisture is less than 70.0%, no qualification of the data is necessary. If the percent moisture is greater than or equal to 70.0% and less than 90.0%, qualify detects as estimated (J) and non-detects as approximated (UJ). If the percent moisture is greater than or equal to 90.0%, qualify detects as estimated (J) and non-detects as unusable (R) (see Table below).
- 3. Note, for Contract Laboratory COR action, numerous or significant failures to accurately quantify the target compounds or to properly evaluate and adjust CRQLs.
- 4. Results between MDL and CRQL should be qualified as estimated "J".
- 5. Results < MDL should be reported at the CRQL and qualified "U". MDLs themselves are not reported.

Table. Percent Moisture Actions for Low/Medium Volatiles Analysis for Non-Aqueous Samples

| Criteria | Action | | |
|--------------------------|-------------------------------|-----------------------------------|--|
| | Detected Associated Compounds | Non-detected Associated Compounds | |
| % Moisture < 70.0 | No qualification | | |
| 70.0 < % Moisture < 90.0 | J | UJ | |
| % Moisture > 90.0 | J | R | |

The sample quantitation evaluation is to verify laboratory quantitation results. In the space below, please show a minimum of one sample calculation:

Sample ID

FA41752-2MS

Hexachlorobutadiene

RF = 0.367

[] = (127998)(50)/(0.367)(715289) = 24.38 ppb Ok

All criteria were met __X__ Criteria were not met and/or see below ____

| В. | Percent Solids |
|----|---------------------------------------|
| | List samples which have ≥ 70 % solids |
| | |
| | |
| | |

QUANTITATION LIMITS

A. Dilution performed

| SAMPLE ID | DILUTION FACTOR | REASON FOR DILUTION |
|-----------|-----------------|---------------------|
| | | |
| | | |
| | | |
| | | |
| | | |
| -acat | | |
| | 100 | |
| | | |
| 2.5 | - 54 | |
| | | |
| | | |
| 4 | | |
| | - | |
| | | |

| All criteria were met _ | _X_ | |
|-------------------------|-----|--|
| Criteria were not met | | |
| and/or see below | | |

OTHER ISSUES

| A. | System Pe | rformance | |
|---------|-------------------|--|------------------------------------|
| List s | amples qualifi | ed based on the degradation of system perf | formance during simple analysis: |
| Samp | ole ID ======= | Comments | Actions |
| No_ | degradation_c | of_system_performance_observed. | |
| Actior | 1: | | |
| degra | ded during sa | udgment to qualify the data if it is deter ample analyses. Inform the Contract Labon of system performance which significantly | ratory Program COR any action as a |
| B. | Overall Ass | essment of Data | |
| List sa | amples qualific | ed based on other issues: | |
| Samp | le ID | Comments | Actions |
| | | ues_observed_that_require_qualification_of _decission_purposes | |

Action:

- 1. Use professional judgment to determine if there is any need to qualify data which were not qualified based on the Quality Control (QC) criteria previously discussed.
- Write a brief narrative to give the user an indication of the analytical limitations of the data. Inform 2. the Contract Laboratory COR the action, any inconsistency of the data with the Sample Delivery Group (SDG) Narrative. If sufficient information on the intended use and required quality of the data is available, the reviewer should include their assessment of the usability of the data within the given context. This may be used as part of a formal Data Quality Assessment (DQA).

EXECUTIVE NARRATIVE

SDG No:

FA41752

Laboratory:

Accutest, Florida

Analysis:

SW846-8260C

Number of Samples:

12

Location:

BMSMC - Humacao, PR

SUMMARY:

Twelve (12) samples were analyzed for selected volatile organic compounds (Hexachlorobutadiene from the VOA Special List) by method SW846-8260C. The sample results were assessed according to USEPA data validation guidance documents in the following order of precedence: USEPA Hazardous Waste Support Section SOP No. HW-33A Revision 0 SOM02.2. Low/Medium Volatile Data Validation. July, 2015. The QC criteria and data validation actions listed on the data review worksheets are from the primary guidance document, unless otherwise noted.

Critical issues:

None

Major:

None

Minor:

None

Critical findings: Major findings:

None

None

Minor findings:

 No target analytes detected in the method blank except for the cases described in the Data Review Worksheet. Hexachlorobutadiene was detected in sample FA41752-6 below the reporting limit. Results for haxachlorobutadiene in sample FA41752-6 reported as nondetected (U) at the reporting limit. Hexachlorobutadiene not detected in the other program samples. No qualification performed.

COMMENTS:

Results are valid and can be used for decision making purposes.

Reviewers Name:

Rafael Infante

Chemist License 1888

Robert Da Parte

Signature:

June 22, 2017

Date: